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USSR Report

TRANSPORTATION

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MOTOR VEHICLES AND HIGHWAYS

OFFICIAL'S REPORT ON RSFSR HIGHWAY BUILDING EFFORTS

Moscow AVTOMOBILNYYE DOROGI in Russian No 1, Jan 86 pp 1-4

[Abridged report of Leonid Aleksandrovich Gorshkov, deputy chairman of the RSFSR Council of Ministers, at a republic conference on the problems of developing the network of roads in the RSFSR, 16 November 1985]

[Excerpts] Further development of the country's road facilities is stipulated by the Project for Basic Trends. For the RSFSR, with its immense spaces, the development of a road network is an important state task.

The party Central Committee and the Soviet Government, devoting a great deal of attention to this issue, adopted a resolution on additional measures for the development, in 1986-1990, of a network of roads for general use in the RSFSR.

In the 12th Five-Year Plan in the RSFSR no less than 54,000 kilometers of road will be built for general use, as well as 57,000 kilometers of inter-facility road. This will allow the proportion of general-use roads with a hard surface to be brought up to 90 percent of the total network, and the extent of inter-facility paved roads to be increased two-fold. It is planned primarily to complete the establishment of and secure the improvement of a basic network of main roads.

The task has been set so that in the Five-Year Plan all rayon centers will have access to main roads and the central settlements of kolkhozes and sovkhoses will be linked to rayon centers.

It also remains to significantly improve the links of the brigades and detachments at livestock complexes, farms, and points of procurement, storage and primary processing of production with the central settlements of kolkhozes and sovkhoses.

The republic has a good head start in fulfilling the assigned tasks. In the last 15 years much has been done toward developing the road network in the republic. The amount of general-use paved road has increased by 145,000 kilometers (69 percent) in three five-year plans, and the amount with an improved surface by 111,000 kilometers (1.5-fold). The qualitative state of the network has improved substantially; in the beginning of 1971 the proportion of general-use road with a hard surface was 39 percent of the total and by 1985 it had increased to 75 percent.

The state is allotting huge capital investments to the construction, repair and maintenance of roads. In the 11th Five-Year Plan more than 20 billion rubles went toward these purposes.

Modern vehicle highways have appeared on the map of Russia. They link the cities of Khabarovsk and Komsomolsk-on-the-Amur, Chita and Irkutsk, Arkhangelsk and Vologda, Saratov and Penza; highway bypasses of the cities of Orel, Belgorod, Novgorod, Smolensk and several others have been built. Bridges have been commissioned across the Amur, Don, Neva and Sura rivers in the Chuvash ASSR city of Yadrina and the Altay Kray city of Katun.

The establishment of a network of inter-facility paved roads at kolkhozes and sovkhoses has been widely promoted. For these ends 56 specialized trusts, including 567 road construction subdivisions, have been organized in the Roskolkhoz-stroyobyedineniya system. Much has been accomplished and a large role belongs to party and Soviet organs in this work. The volume of road construction in the Volgograd, Belgorod, Penza and Saratov oblasts and the Kabardino-Balkar and Mari autonomous republics will increase 1.5-1.8-fold in the course of the five-year plan. The number of oblasts, krays and autonomous republics that commission 200-250 and even 400 kilometers of general-use road annually has increased.

It should be noted that the decree of the Presidium of the RSFSR Supreme Soviet from 7 April, 1959, "Participation of Kolkhozes, Sovkhoses, Industrial, Transport, Construction and Other Enterprises and Economic Organizations in the Construction and Repair of Motor Vehicle Roads" has substantial influence on the development of road facilities in the republic. The necessity of enlisting the material, labor and financial resources of enterprises, organizations and kolkhozes for the construction and maintenance of vehicle roads is reaffirmed in the plan of Basic Trends in the Economic and Social Development of the USSR for 1986-1990 and for the Period up to 2000.

Local councils of people's deputies should make full use of their rights in this matter, strictly exacting responsibility from those who decline to participate in the construction and repair of roads, up to the use of fines against such organizations and enterprises and against their directors personally.

In the decision of the USSR Council of Ministers and the CPSU Central Committee it is noted that in the Russian Federation the rates of development of roads and the technical state of the road network still do not meet the demands of the national economy. This holds up the solution of social-economic problems, especially in rural areas.

At the present time the republic's road network consists primarily of roads of lower classes. Today more than 125,000 kilometers of general-use roads are dirt ones, impassable in spring and fall and even in summer after heavy rains; 11 percent of rayon centers and 18 percent of central kolkhoz and sovkhos settlements do not have reliable access to the basic road network. The proportion of improved surfaces, although it has increased significantly in recent years, comprises only 40 percent of the total of general-use roads. Inter-facility paved roads comprise 59,000 kilometers, or 12.3 percent of the total demand for them.

In fulfilling the plan for four years of the five-year plan, on the whole over the Russian Federation fulfillment of the state plan was not secured in 13 autonomous republics, krays and oblasts by RSFSR Minavtodor organizations. Among them are the Tambov, Sakhalin, Yaroslavl and Kalinin organizations.

The contract construction organizations of Roskolkhozstroyobedineniye, in 17 ASSRs, krays and oblasts in the current five-year plan, failed annually to fulfill construction plans for inter-facility paved roads at sovkhozes and other state agricultural organizations. The planned commissioning of inter-facility roads in the Khabarovsk Kray and the Chita Oblast was not secured. For example, the plan for four years of the five-year plan for the construction of such roads in the Buryat ASSR was only 3.7 percent fulfilled, 24 percent in the North Osetian ASSR, and 29 percent in the Tuva ASSR.

The interests of the matter demand that RSFSR Minavtodor, Roskolkhozstroyobedineniye and other ministries and authorities of the RSFSR, and the local councils take daily control of the execution of measures for the acceleration of construction and commissioning of roads by concentrating existing material and financial resources and improving the technology and organization of production.

In the Russian Federation there is a large quantity of authority and access roads that belong to a number of union and republic ministries. These roads can and should be used to meet the demands of the entire economy of the republic. Thus it is necessary to enhance the role of the RSFSR Ministry of Motor Vehicle Roads in coordinating the construction and operation of roads in the Russian Federation and conducting a unified technical policy. Here the RSFSR Minavtodor should be afforded substantial help by local organs of Soviet authority.

The councils of ministers of autonomous republics, krayispolkoms and oblispolkoms should direct the efforts of highway organizations toward the construction and maintenance of sectors of highway that are of importance to the state and the republic with the most intensive movement on approaches to large cities as well as to the replacement of small-capacity bridges with bridges that allow the passage of modern transport vehicles.

Many sectors of highway in the RSFSR require basic reconstruction, such as the routes from Moscow to Chelyabinsk in the territories of the Ryazan, Kuybyshev and Chelyabinsk oblasts and the Bashkir ASSR, Moscow to Voronezh to Rostov-on-the-Don in the Lipetsk and Voronezh oblasts. Roads are being built slowly in areas of large transport units--the cities of Gorky, Rostov-on-the-Don, Kuybyshev and several others. The Krasnoyarsk-Irkutsk, Kirov-Sykt'yvkar and Ustinov-Perm roads are being updated at very slow rates.

On a number of routes that provide the transport link with adjacent oblasts and autonomous republics conditions have not been established for satisfactory passage. For a long time dirt breaks have not been eliminated in roads of significance to the republic--a 22-kilometer stretch on the Rostov-Ivanovo-Gorky road on the border between the Ivanovo and Gorkiy oblasts, a 25-kilometer stretch on the Rostov-on-the-Don-Azov-Krasnodar road between the Rostov Oblast and the Krasnodar Kray, and several others.

In the republic there are good examples of the problem of improving the network of roads of state and republic significance being solved without additional capital investments and resources. The experience of road workers of the Moscow and Leningrad oblasts merits widespread dissemination; in capital repairs of the Moscow-Leningrad road they secured significant improvement of its transport-operational characteristics, improved its category in many sectors and relieved a number of populated points of through traffic.

Today a particular place is occupied by the problem of replacing existing wooden bridges of small capacity with capital ones on roads of state and republic significance and on oblast roads with a high density of freight traffic; this problem should basically be solved in the 12th Five-Year Plan. At the present time on general-use roads in the RSFSR there are about 29,000 such bridges with a total length of more than 345 kilometers (30 percent) and 149 ferry crossings.

RSFSR Minavtodor and Roskolkhozstroyobyedineniye must, in the shortest possible time, increase the production of prefabricated reinforced concrete and metal bridge constructions. For this the RSFSR Minavtodor must better utilize existing production capabilities, rebuild the Khotkovskiy Research-Development Plant for bridge construction in the Moscow Oblast and completely assimilate the capabilities of the Borisovskiy Plant for bridge metalwork in the Belgorod Oblast. Roskolkhozstroyobyedineniye must adjust the production of reinforced concrete bridge structures at its plants, the capacity of which is today only 76 percent utilized.

In recent years RSFSR Minavtodor and Roskolkhozstroyobyedineniye organizations and enterprises, with the participation of party and Soviet organs, have carried out specific work oriented toward developing capabilities for the production of stone materials. In the current five-year plan about 300 million cubic meters of crushed stone and gravel have been produced for highway construction.

However, it should be noted that the ministry, certain local councils and highway organizations are still only weakly involved in the development of their own base for increasing the production of construction materials. In the Tambov and Kursk oblasts, for example, they experience an annual shortage of stone materials. At the same time, work is being unenthusiastically conducted in these oblasts on the reconstruction of quarries: the Krasnosulinskiy in Tambov Oblast and the Korosten-Shchersovskiy in Kursk Oblast.

Real "marathon construction" projects include construction of the Kipriyskiy crushed rock plant in Novgorod Oblast with a capacity of 300,000 cubic meters, the Lipkinskiy crushed rock plant in Volgograd Oblast with a capacity of 500,000 cubic meters and the Chembulat-Bikinskiy quarry with a capacity of 400,000 cubic meters in the Kirov Oblast.

USSR Minstroy, USSR Mintyazhstroy and USSR Minpromstroy should examine the problem of speeding up the commissioning of these objectives, which would provide an annual increase of more than 3 million cubic meters of crushed rock for the republic's highway facilities.

One of the largest resources for making up the shortage of rock materials is the widespread use of metallurgical slag in the foundations of pavement. In 1985

Roskolkhozstroyobyedineniye highway workers used more than 3 million cubic meters of this industrial waste. It is also used in the RSFSR Minavtodor system. However, today application of this resource-conservative technology depends solely on the enthusiasm of local managers. In addition, the utilization of slag solves an important environmental problem.

Planning organs should carefully examine the problem of organizing centralized delivery of slag to highway organizations.

The development of their own production-repair base, with which RSFSR Minavtodor organizations are only 80 percent supplied, is of great importance in increasing the efficiency of highway construction. Understanding the significance of these problems, the Mordovian, Mari and Tyumen highway organizations have displayed businesslike initiative.

In recent years, in connection with the growth of the motor vehicle transport network and the intensification of traffic, the demands on highway-operation service are ever increasing. However, to acknowledge the satisfactory upkeep and state of many highways today is impossible. The established normal repair periods are observed (on the whole throughout the ministry) only on the network of roads of state and republic significance, and even then not in all oblasts.

This work is poorly organized on inter-facility roads, with the result being that out of 59,000 kilometers of such road presently found on kolkhozes and sovkhozes, most of which was built during the 10th and 11th five-year plans, about 12,000 kilometers currently require updating or complete restoration. The RSFSR Council of Ministers, back in 1984, entrusted RSFSR Minselkhoz, RSFSR Minavtodor and Roskolkhozstroyobyedineniye with examining the problem of organizing repair service and maintaining inter-facility roads, however, specific proposals have so far not been received from them.

Poor transport-operation indicators for roads are one of the causes of accidents in motor vehicle transport. The modern highway should be equipped with the buildings and facilities necessary for the satisfaction of the needs of passengers and drivers as well as for the maintenance of motor vehicles. However, it should be noted that this construction on roads significantly lags behind the demands of time.

Drivers and passengers fairly criticize road service for the fact that, on the road it is not always possible to get a room in a motel or hot food, or to place a telephone call. On the majority of roads there is no technical assistance service for motor vehicle transport and much time is wasted in lines at filling stations. This applies primarily to such main highways as the ones from Kuybyshev to Ufa to Chelyabinsk and Chelyabinsk to Sverdlovsk to Moscow to Kazan. Similar defects exist on other highways as well, especially in the rayons of the Urals, Siberia and the Far East.

At the present time the equipment of a number of main highways in the republic with facilities is being carried out on the basis of general plans, approved by the RSFSR Council of Ministers, which put this work on a planning basis and allowed the linkage of the interests of many interested ministries and authorities.

RSFSR Minavtodor, in cooperation with republic Minavtotrans, Mintorg, Minzhilkomkhoz, Goskomnefteprodukt, Rospotrebsoyuz, other interested organizations, councils of ministers of the autonomous republics, krayispolkoms and oblispolkoms, is required to activize its operations, not only on state highways, but on republic and oblast ones as well. It is imperative to develop long-term plans for their complex construction and to carry out this work continuously and in a goal-oriented manner.

Huge reserves for the further comprehensive upgrading of socialist economy are to be found in speeding up scientific-technological progress. Design and scientific-research organizations are called on to play a leading role in the battle for technological progress in road facilities. The growth of labor productivity, reduction in cost and improvement of the quality of highway operations depend in many ways on their creative efforts.

The RSFSR has its own design and scientific center in the area of highway construction and repair--GiproDornii with its ten affiliates.

Road science has done interesting projects directed toward reducing the cost and energy intensiveness of construction, repair and maintenance on roads. New resource-conserving technologies have been proposed for the construction of road surfaces on the basis of variable-strength stone materials with a self-renewing roughness of the surface from damp organic-mineral mixtures and a highly-porous bituminous concrete. Unfortunately, these developments are being used in extremely limited quantities.

Here in a number of cases there is a faulty practice on the part of the directors of certain construction contracting organizations--the effort to take material that is both more expensive and further. Such a practice must be stopped, and in this a role should be played by the corresponding organs of RSFSR Minavtodor, Roskolkhozstroyobyedineniye, RSFSR Gosstroy and RSFSR Gosplan.

Increasing labor productivity by instituting the achievements of scientific technical progress is of great significance in the intensification of highway facilities. The rates of implementation of scientific-technical achievements in the practice of highway construction depends in many ways on the design organizations. General-use roads are designed by large institutes and specialized oblast offices and design estimate bureaus that operate on a fairly high level.

The planning of inter-facility roads is conducted by almost 100 design organizations of various ministries and authorities, and a unified technical policy is lacking in this work. As a result, the approach varies toward the application of acting standard documents, errors in design solutions are allowed and local construction conditions are not always taken into consideration. All this leads to a worsening in the road's operational indicators. The chief institute for the design of inter-facility roads, Penzaselkhozdorproyekt, that has been set up in Roskolkhozstroyobyedineniye has still not become a center that coordinates the activity of highway design organizations.

In the 11th Five-Year Plan the total energy supplied per job in highway organizations rose almost 30 percent. At the present time in RSFSR Minavtodor and

Roskolkhozstroybyedineniye there are more than 100,000 road machines and motor vehicles. This fleet carries out 99 percent of all earth, assembly and loading-unloading operations. Increasing the level of mechanization of highway operations allowed, in the construction of general-use roads alone, an almost 40 percent reduction in the specific volume of manual operations in comparison with 1980. However, there is still much manual labor remaining in the repair and maintenance of highways. Out of 147 technological operations, only 71 are mechanized here, and in the field as a whole the proportion of workers doing manual labor is 36 percent.

It should be noted that Minstroydormash, in close cooperation with the workers of highway organs, has recently set up a number of progressive highly productive machines that meet the modern demands of highway construction. However, the range of machines put out by these ministries does not provide for the mechanization of a number of technological operations and the volume of production of powerful highly-efficient machines falls significantly behind the demand, which delays the displacement of manual labor. In holding machine builders to legal requirements regarding technical level, reliability, range, volumes of machine production, one cannot forget about the utilization of the huge potential that highway workers already have.

RSFSR Minavtodor today has available a large fleet of devices and machines. Its basic funding grew from 1 billion 600 million rubles in 1981 to 2.1 billion rubles in 1985, or more than 20 percent. At the same time capital productivity per ruble of basic funds was reduced. RSFSR Gosstroy and the republic planning organs should help the ministry determine the causes of this situation and plan concrete measures to remedy it. The main reason for this is insufficiently intensive use of basic means. Road machines in the RSFSR Minavtodor system operate, on the average, only 9.6 to 9.7 hours out of 24, and 11-12 on assignment.

The possibilities of print, radio and television should be used in every possible way to spread the experience of the leading collectives of highway organizations, the widespread enlistment of laborers in the development of a highway network in the Russian Federation and the increased prestige of the road worker's profession.

It is necessary to establish constant strict control to fulfill the resolutions of the party and government. RSFSR Minavtodor, Roskolkhozstroybyedineniye and the ispolkoms of local councils must raise the level of responsibility on the part of managers of production directorates and road construction trusts for the completion of scheduled planned projects by each enterprise and organization. Local councils must systematically examine the process of fulfilling the resolutions at sessions of oblast and rayon councils of people's deputies and oblispolkom meetings.

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MOTOR VEHICLES AND HIGHWAYS

UPDATE ON GAZ WORKS MODERNIZATION EFFORTS

Moscow IZVESTIYA in Russian 3 Dec 85 p 2

[Article by special Izvestiya correspondents A. Yershov and V. Romanyuk: "The Program of the GAZ Plant: Redesign, Its Advantages and Problems" under the rubric Shorthand Record; capitalized passage in boldface]

[Text] THE METALLURGICAL PRODUCTION OCCUPIES A SPECIAL PLACE IN THE RETOOLING OF THE GAZ. THIS IS WHAT SETS THE PACE OF THE MAIN CONVEYOR BELT. AS THE SHOPS ARE OUTFITTED WITH AUTOMATIC MOLDING LINES, THE NATURE OF THE WORK PROCESS IS CHANGED AND MANY MANUAL JOBS ARE ELIMINATED, EVEN THE PROFESSIONS OF THE MOLD HANDLERS AND KNOCKOUT WORKERS. WHILE PREVIOUSLY 40 PERSONS WERE EMPLOYED AT THE CONVEYOR, NOW THERE ARE ONLY 8 LINE ADJUSTERS. IN 1986, THE METALLURGISTS OF THE AUTOMOTIVE PLANT INTEND TO COMPLETE THE RETOOLING OF THE MOLD SECTORS OF THE CASTING SHOPS AND FREE UP MORE THAN 600 PERSONS. BUT HOW IS THE REDESIGN OF THE INDUSTRY TURNING OUT?

V. CHURAYEV, head of the metallurgy department: We have been busy with the redesign for four years now. We hope to complete it in 1987. At that time we will fully convert to automatic equipment in the mold section, freeing up 1500 people.

I. SHUBNIKOV, SMU-1 brigade leader of the GAZremstroymontazh Trust: We are carrying out the redesign in an economical way, during an active operation. It has its problems. The designers usually request a totally clear area. If we were to follow such course, the equipment would lie around for years at the construction site, becoming unusable. No, we are always looking for the optimal version, cooperating with nearby brigades, developing consolidated time charts, occasionally even hourly charts. Sometimes you don't sleep at night, racking your brain over how to perform the installation with a minimum of machinery. Adaptations are necessary: shortening the excavator arm, trimming the body of the machine. Every plant where the redesign is being carried out in conditions of active production is such a madhouse today. This is what I think about the matter: if we are serious about this project, we should create special equipment for it--tractors, load trucks, large-capacity maneuvering cranes, carts. Such task should be given to the mechanical engineers in the final version of the Principal Strategies.

F. IVANOV, brigade leader at the site preparation: It is often necessary to solve problems with many unknowns. How to take apart the old structures,

whether to tunnel across an operating conveyor, and there are no approaches, the excavators do not have the necessary reach. A knowledge of the technology is helpful: many of our brigade members are former foundry workers. It is a regular holiday when we are able to complete the complicated work in conditions of an operating industry with a tight time schedule. Still and all, overtime is accruing. How do we pay for this? According to the current regulations, this should not exceed 120 hours per person per year. But if there is more? After all, this happens very often in redesign projects. But at present, even the ministry is ignoring this typical problem.

G. BUSHMIN, leader of an installation brigade: Recently automatic molding lines produced by our association were installed. It is simply a pleasure to carry out such installation--everything fits exactly, there are no deviations from the blueprint. And in general, when a machine is built at a plant, all the discrepancies are easily solved. But some of our partners are not overly responsible. The Baku Electrothermal Equipment Plant delivers induction crucible furnaces in which the parts do not join. But they have managed to get them certified with the Seal of Quality! There is absolutely no response to our remarks and inquiries. I think that the concept of ethical and material responsibility of the equipment providers vis-a-vis the customers should be more clearly expressed in the Principal Strategies.

YE. SIDORIN, leader of a brigade of electricians, winner of the Government Prize: The GAZ has its own project administration in charge of the redesign. The designers work in direct contact with the construction brigades. The parallel process of design and assembly produces no little time advantage. Such method requires definite, coordinated work of all participants of the redesign. Alas, we do not always achieve this. Recently a designer came up to me and said: you set up the conveyor, and then I'll draw you the blueprint for it. Is this cooperation? Another instance: we must hang a conveyor from columns, but the designers tell us that the columns won't support it. We stand around waiting for a decision and the most valuable commodity is lost--time!

V. CHURAYEV: The draft of the new wording of the CPSU Program sets the task of radical improvement in the investment policy: we must achieve the maximum increase in production for every ruble spent. Experience shows that success is dictated by efficient cooperation of all members of the redesign process on the "work relay" principle. But at the same time, there should be a better procedure of interaction and a single system of material incentives for construction, design and process workers. And the material-technical support of items scheduled for retooling should be done differently. Usually, over the course of 2-3 years it is necessary to requisition equipment and conduct a lengthy coordination at various levels. Today, such procedure doesn't help anyone: we need new technology promptly, and tomorrow's technology, not yesterday's, as often happens.

K. BESPALOV, head of the technology administration of the GAZ Association: You all agree that the customer should determine the whole: both the precision class of the machine and its operating conditions. However, the dictates of the manufacturer are still in force: whether you want it or not,

take it, otherwise you get nothing at all. It should become an absolute law to manufacture equipment for a developed technology, and not adapt a technology to the equipment being manufactured. In this connection, I submit a revision of the wording of the Principal Strategy, where it says: "In the machine tool and tool industry, accelerate the production of progressive technology essential for the retooling of the machine industry." I would like to see the second part of the sentence in a new wording: "...completely provide this technology to entities undergoing retooling in the 12th and following five year periods."

A. KUDRYAVTSEV, assistant chief technologist of the association: To this I would like to add: a new technical level of production is inconceivable without a new level of production control. In other words, to assure an effective use of new technology, there must be universal adoption of data processing equipment and automated control systems, including automated control of planned preventive maintenance.

V. VESELOVSKIY, deputy chief engineer of the metallurgy department: I would like to mention the involvement of construction and installation workers of the specialized organizations in the reconstruction. Up till now, they have all remained aloof from such projects. This is understandable: enormous labor costs, confined space, nowhere to set up equipment and create a construction "embankment". As an example, construction/installation work to the amount of 4-5 thousand rubles per man per month is scheduled for the installation brigades of the Volgostal'konstruktsiya and Promventilyatsiya trusts, whereas not even a fourth of this sum can be earned in conditions of operating shops. It is necessary to resort to various stratagems with the wages, violating instructions of 15 year standing. Although, on principle, it is long time to develop new rules allowing each worker to be paid for the work done, and to redistribute the wage fund among the participants of the redesign.

YE. SIDORIN: Several of the shop foremen regard the new technology being installed as a natural disaster. Why? Because it breaks the pace of the production. I feel that, during a time of such radical reorganization, it is necessary to provide some additional incentives for the production workers, so that they profitably employ the new technology. Perhaps flexible corrections can be introduced into the plans. Everything should be judged by the end result. If we judge by instant advantage, the results of the redesign will be long in coming.

I. KRASNOV, assistant director of administration of capital construction of the association: No small part is assigned to the economical method in the redesign. But as yet, conditions of "maximum encouragement", so to speak, have not been created for it. Material resources are not allocated in a centralized manner. The planning of the redesign is being done per million rubles of construction/installation work, as with a new construction, even though it would be preferable to keep the books in terms of physical volumes. After all, the structure of the materials used in the redesign is totally different from that of a new construction. Usually twice as much metal and cement is required.

G. BUSHMIN: That is certainly a major point. And another: we are working, as it were, shoulder to shoulder with the metallurgists, in the hot furnaces. However, we do not enjoy the privileges of the hot shops. The project of the Principal Strategies outlines measures to improve the wage scale for the different sectors of the economy, as well as the different categories of worker, allowing for the complexity and the working conditions. I do not feel there is anything preventing this from being specified vis-a-vis the brigades carrying out redesign of entities in mechanical engineering, metallurgy and chemistry.

Let us summarize several points. To shift the center of gravity from new construction to technical retooling and redesign of existing enterprises is the requirement contained in the project of the new version of the CPSU Program. The example of Gorkiy is valuable in that they have already accomplished this turnaround in the 11th Five Year Period and are building their strategy of renovation in the 12th period with a view to the past experience. In the GAZ redesign project, the costs for new construction are no more than 7 percent, all the remainder going to acquisition of new machinery and development of progressive technologies. By 1990 the labor productivity at the GAZ will increase 1½ times. For the workers of the auto plant during these years no less than 900,000 square meters of living space, preschool and school facilities, a community center, a shopping center and two polyclinics will be constructed.

Successful accomplishment of these plans will depend to no small extent on the efficient organization of the work at the redesign sites. The above statements have articulated quite a lot of specific comments to the organizations responsible for the retooling and redesign of the gigantic enterprise.

At the same time, problems whose solution depends on the central authorities have been identified. Primarily, it is a question of making corrections in the work schedule of the enterprises carrying out the radical redesign of production, upgrading the construction norms and work procedures involving retooling of existing productions, and perfecting the payment system for the labor of brigades working at the redesign sites. As the 12th Five Year Plan assigns a priority to redesign and retooling, all matters relating to the supervision and planning of construction work in conditions of existing enterprises should be clarified.

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MOTOR VEHICLES AND HIGHWAYS

BAKU EXPERIENCE IN OPERATING LNG-POWERED VEHICLES

Baku VYSKHA in Russian 24 Jan 86 p 2

[Article:"Gas Instead of Gasoline", correspondence by R. Rustamov, chief engineer GAPT of the Bakpromtorgtrans Association of the Ministry of Automotive Transportation of the Republic, with a commentary by A. Gamedov; capitalized passages published in boldface]

[Text] THE INFORMATION ABOUT THE CONSTRUCTION OF AN AUTOMOTIVE PLANT AT KIROVABAD (VYSHKA 28 AUG 1985) HAS INTERESTED OUR READERS. THEY WANT TO KNOW WHAT IS GOING ON AND WHY THE NEW TRUCKS ARE SCHEDULED FOR PRODUCTION WITH DIESEL MOTORS, WHEREAS THE PRINCIPAL DEVELOPMENTAL STRATEGIES PROJECT OF THE NATION HAS SET THE TASK OF SUBSTANTIAL INCREASE IN THE USE OF LNG-POWERED AUTOMOBILES AND AN ACCELERATED CONSTRUCTION OF GAS-FUELING STATIONS.

THE ADVANTAGE OF GAS FUEL IS OBVIOUS: IT IS ECONOMICAL AND DOES NOT POLLUTE THE ATMOSPHERE. MORE MUST BE WRITTEN ABOUT WHAT IS BEING DONE IN AZERBAIJAN FOR INCREASED APPLICATION OF GAS IN AUTOMOTIVE ENGINES. SUCH PROPOSAL, IN PARTICULAR, COMES FROM ELECTRICAL MECHANIC R. GANIYEV, ENGINEER SH. ABBASOV, K. YERMOLAYEV AND OTHERS.

WE PUBLISH A COMMUNICATION FROM THE FIRST TRUCK CONCERN WITHIN THE SYSTEM OF THE MINISTRY OF AUTOMOTIVE TRANSPORT WHICH HAS BEGUN TO USE GAS INSTEAD OF GASOLINE, AND A COMMENTARY WITH GENERAL DISCUSSION OF WHAT HAS BEEN DONE IN THIS AREA IN THE REPUBLIC, AND WHAT REMAINS TO BE DONE.

The Trucks With the Red Tanks

In the past year the people of Baku will have surely noticed the trucks with red tanks suspended at the left side of the cab, slightly in back of it. The tank is used to store liquefied gas, used as fuel instead of gasoline.

Our truck enterprise has 20 such vans on the GAZ-52-08 chassis. They have been in operation since July of last year and have hauled 15,000 tons of freight.

In terms of quantity, the trucks use as much gas as gasoline, but (as we know) gas is three times cheaper. Here is where the savings lie.

Another factor: a fully-loaded gas tank is good for 440 kilometers of travel. This means that, in conditions of inner city haulage, there is enough fuel for 2-3 days of operation. Consequently, the trucks should require gas fueling no more often than with gasoline.

Moreover, the motor life is increased by a factor of $1\frac{1}{2}$ when using liquefied gas. And, presently of special concern, the toxicity of the exhaust with the new fuel is 3-4 times lower than that of gasoline engines.

Such advantages of the gas-tank trucks justify a broad use within the capital of the republic for delivery of various cargo to the enterprises and to the merchandising centers with minimal atmospheric pollution.

Calculations show that the overall annual economic impact at our enterprise from the use of a single gas truck is 1200 rubles.

Naturally, there are certain difficulties in the introduction of gas trucks, as with any other innovation: there are no specialists for maintenance and repair of the gas equipment, as yet the essential repair base of specialized equipment and tools is lacking, there are no fixed gas fueling stations and the trucks in use are fueled with liquefied gas by a mobile station. But all these difficulties are temporary. It appears that the new trend in automotive transportation will steadily evolve.

R. Rustamov, chief engineer
of the GAPT [no expansion
given] of the Bakpromtorgtrans
Association of the Ministry of
Automotive Transport of Azer-
baijan

Our Commentary

The Project of Principal Economic and Social Development Strategies of the USSR has set a specific task: to economize 18-20 percent of the gasoline and diesel fuel in 1990 as compared to 1985. And the use of gas instead of gasoline in automobiles will help reach this goal. It is therefore necessary to expand the use of gas automobiles and accelerate the construction of gas fueling stations.

Even though the experience in this area is slight, the transportation industry (judging from the correspondence of R. Rustamov) is aware of the advantages of gas-using vehicles. "They are no worse than gasoline-using vehicles in operation" is the consensus of the workers at the Ministry of Automotive Transportation.

First deputy minister A. Kerimov declares that the field is ready to put in operation any given number of vehicles using liquefied gas. The immediate question arises: why liquefied gas?

This gas is the by-product of petroleum processing and consists of the propane-butane fraction. It is readily liquefied, can be transported in simple equipment, and inexpensive portable equipment is used to fuel the automobiles. There are three such installations in the ministry, and their number is increasing this year. Up till now, one installation has sufficed for the fueling of 20 trucks. Consequently, no matter how many new trucks arrive, there will be no problems with the fueling.

But natural gas is also used as a fuel in engines. This has low density and its transportation is complicated by the fact that it is done under high pressure in thick-wall steel cylinders. Complicated equipment is needed to fuel the vehicles. Therefore, the truck industry is striving to increase the number of vehicles using liquefied gas.

The 1986 plan of the Ministry of Automotive Transport calls for 26.5 million ton-kilometers of freight and 6.6 million kilometers paid mileage with gas vehicles. Accordingly, the allocation for gasoline has been reduced by 2000 tons as of the first of January.

Even so, there are not enough gas-using trucks or cars available to accomplish the plans of the ministry. When will they arrive? According to the head of the department of transportation and communications of the Azerbaijan Gosplan, I. Sadykhov, funds are available to purchase 140 of the GAZ-24 Volga automobiles. These will be used in the taxi services of the ministry. Today, there are 40 gas-using trucks in the republic. In the current year, another 275 vehicles will be added to them. Furthermore, the ministry will receive 500 sets of gas equipment to modify its existing vehicles.

It is scheduled to construct a gas fueling station at Baku, filling 500 vehicles per day. Its construction has already begun. By the end of the year, it should be in operation. The transportation offices must take measures to retrain the drivers and attending personnel--they must know how to deal with the gas-powered vehicles.

As for the production of diesel automobiles, it should be said that they also have a number of advantages: they use a fuel that is cheaper than gasoline and they pollute the atmosphere less. Today, only 23 percent of all manufactured trucks are furnished with diesels. In future, their proportion shall increase. In anticipation of this, scientists are investigating the use of gas fuel in diesel engines as well.

A. Gamedov

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MOTOR VEHICLES AND HIGHWAYS

OFFICIAL ON SOVIET TRUCK DESIGN PLANS

Moscow IZVESTIYA in Russian 16 Jan 86 p 2

[Interview of A. I. Titkov, director of the Experiment and Design Administration of the USSR Ministry of the Automotive Industry, by V. Popov: "The Truck of Today and Tomorrow" under the rubric From Authoritative Sources; passages in slantlines published in italics; those capitalized in boldface]

[Text] /In the 12th Five-Year Plan, the production of more than 150 new models and modifications of trucks will be organized/

/The truck mileage up to major overhauling will increase by a factor of 1½/

/By 1990, more than one-third of the trucks being manufactured will be outfitted with diesel engines/

Judging from our mail, many readers are interested in what new models of truck will come off the assembly lines in the 12th Five Year Plan, and how they will differ from the previous ones. By request of an Izvestiya correspondent, A. I. Titkov, director of the Experiment and Design Administration of the USSR Ministry of the Automotive Industry, talks on this subject.

POPOV: FIRST OF ALL, ANATOLIY IVANOVICH, I WOULD LIKE TO KNOW WHAT DEMANDS YOU, AS THE CHIEF DESIGNER OF THE SECTOR, ARE PLACING ON THE MODERN TRUCKS?

TITKOV: In accordance with the Basic Guidelines of Economic and Social Development of the USSR for 1986-1990 and the period up to the year 2000, the task is to raise the quality of production of our sector to the level of the best Western models. Which means, that the new and modernized automobiles, primarily trucks, should be distinguished by high performance, minimal specific consumption of materials and low operating expenses.

In the past five year periods, the fuel consumption by automobile transport has increased by 4-6 million tons, and today more than 40 percent of the liquid fuel produced in the country is used in this way. In the 12th Five Year Plan, the truck fleet is to be increased, while the liquid fuel consumption should remain at the previous level. We will be helped in the solution of this problem by more extensive use of diesel motors, improved designs of the vehicles themselves and a conversion to gaseous fuel.

POPOV: BUT THE EFFECTIVENESS OF TRUCK TRANSPORTATION ALSO DEPENDS ON ITS SPECIALIZATION...

TITKOV: Yes, of course. The customary structure of the automotive park in our country entails the presence of the most diverse sizes of vehicle. However, for historical reasons, there has long been a prevalence of vehicles with medium capacity, from 2.5 to 5 tons, in our country, which did not contribute to rational haulage.

With the release of the KamAZ, the park of machines of 8 or more tons has been gradually filled out, whereas there are not enough small vehicles, up to 2 tons. There are twice as few of these as currently needed by the economy.

The structure of the automotive park should be notably improved with the start of production of a plant for 1½ ton trucks, construction of which has begun at Kirovabad. Today, our executive institute, the NAMI [Central Scientific Research Automobile and Automotive Engine Institute], together with the Ulyanov plant, is designing this truck. It will have a 70 HP diesel engine. It is being designed as a city vehicle, for hard cover roads. And the well-known Ulyanov all-road trucks will go mainly to the countryside.

I would like to stress that the automobile designers regard the transportation of the agroindustrial complex as one of their most important tasks. Recently, the farms began to receive vehicles specially made for work in the fields. The main characteristic of these vehicles, organized at the Kutaisi and Uralsk plants, is a wide range of speeds (from 2-3 to 75 kph). This lets them operate at the same pace as the harvesting combines, on the one hand, and quickly deliver the products to the threshing floors and grain elevators, on the other.

In all, we have developed and are now producing around 100 different models for the countryside.

I may also add that an important condition for high efficiency of automobiles is mechanization of the loading/unloading work. Therefore, the new five year period calls for a modernization of all load trucks being produced and an increase in their production by a factor of 1½. The series production of vehicles with load-lifting sides, hydraulic cranes and other load-lifting devices will begin. This will increase the labor productivity of the drivers by 20-25 percent and produce an important social impact, besides the economic: whereas previously the number of truck drivers increased by an average of 600,000 in every subsequent five year period, by 1990 this growth should cease entirely. Also, 800,000 workers currently employed in loading and unloading will be freed up.

POPOV: NOW, IF YOU WILL, TALK ABOUT THE NEW TRUCK MODELS READY FOR PRODUCTION IN THE 12TH FIVE YEAR PERIOD.

TITKOV: I shall begin with the ZIL-4331. It is equipped with a 185 HP diesel engine. The load capacity of the rig is 12.5-14 tons. The 9-speed

gearbox allows it to operate reliably either at the same pace as various agricultural machinery or as part of a tractor-trailer rig.

The ZIL designers have done much to improve the working conditions of the driver. In particular, the cabins of vehicles intended for our southern republics will be air conditioned, while the vehicles of the northern modification will have more effective heaters.

The Moscow automotive workers have accepted the responsibility of producing the first pilot industrial lot of these vehicles by the time of the 27th Congress of the CPSU.

The new Gorkiy truck has the first installed air-cooled diesel in Soviet automotive design. Its power is 125 HP. The dump truck with trailer can haul 8.6 tons of load. This vehicle will replace the current 4.5-ton GAZ-53A, amounting to more than 70 percent of the agricultural automotive park of the country.

The BelAZ family will receive heavy 180-ton quarry dump trucks, as well as modifications of the 75 and 110-ton vehicles. A superheavy truck with 280 ton capacity will also be created here. Imagine, the body of this giant will easily hold 4½ 60-ton railroad cars with coal or ore.

Our plants are increasing the production of northern, all-road vehicles.

POPOV: AS YOU KNOW, A DIESEL IS ONE QUARTER MORE ECONOMICAL THAN A GASOLINE VEHICLE. UP TO NOW, YOU HAVE TALKED ABOUT DIESEL CONVERSION OF ONLY TWO MODELS, THE ZIL AND THE GAZ. WHAT ABOUT THE OTHERS?

TITKOV: The sector is planning a broad program of conversion of automotive transport to this economical and ecologically more clean fuel. In particular, work is continuing to expand the facilities of the KamAZ. The manufacture of diesels with turbocharger will undergo an especially large development here. A new production of air-cooled diesels is being organized at the Kustanay Motor Plant, under construction. The manufacture of diesel motors at the Yaroslavl Avtodizel Plant is being expanded.

POPOV: THERE IS ANOTHER PROGRESSIVE TREND--CONVERSION OF AUTOMOTIVE TRANSPORT TO LIQUEFIED GAS. WHAT ARE THE PROSPECTS HERE?

TITKOV: On the one hand, there would be no need to worry about gas: a modern gasomobile would save 70-100 liters of expensive gasoline per day of operation. The production of vehicles using methane was begun at the ZIL and GAZ in 1982. The ministry has already put out thousands of such vehicles and 40,000 kits for reequipping vehicles already in use. However, extensive use of gasomobiles is held back by the slow construction of a network of gas compressor stations. The ministry is also producing vehicles using liquefied gas. In Moscow alone, around 15,000 are in use. Previously, the development of the industry was restrained by lack of such gas. Now, the USSR Gosplan is scheduling an annual increase in the production of gasomobiles by a factor of 1½ to 2. But again, the question comes up of construction of a network of

gas filling stations able to provide quality standardized liquefied fuel of stable composition. Let me stress: quality-standardized, stable. Which demands additional efforts from the specialists of the gas industry. I should point out that the use of gas for diesel engines will promote the expansion of gasification of transportation. The scientists of NAMI are completing road tests of diesels working by a gas diesel process, and already in the current year it is scheduled to produce an industrial lot of KamAZ vehicles using liquefied gas.

Obviously, the future gasification of automotive transport requires combined efforts of a number of ministries and agencies, in particular, the Ministry of the Automotive Industry, the Ministry of the Gas Industry, the Ministry for Chemical Machinery, the Ministry of Instruments and the Gosgortekhnadzor [state authority for mining machinery].

POPOV: AND WHAT ARE THE AUTOMOTIVE DESIGNERS DOING TO PROTECT THE ENVIRONMENT? AFTER ALL, ECOLOGICAL CLEANNES IS ONE OF THE IMPORTANT REQUIREMENTS OF A MODERN AUTOMOBILE.

TITKOV: First let me say what has already been done. Toxicity norms have been set, which are much more strict than those of, say, the Western European countries. Our automobiles are now putting out 50 percent less carbon monoxide than 8-10 years ago. But this is not all. The Zavolzhkiy Motor Plant and the Moscow Likhachev Automotive Plant have switched to production of gasoline engines with swirling motion of the mixture charge. The use of such engines will reduce harmful emissions by one quarter, to say nothing of the savings of gasoline.

Finally, the specialists of the sector and of the Ministry of Agricultural Machinery have developed a design of catalytic converter. Thanks to these devices, the toxic emissions are reduced by a factor of 7-8. The first lots of such converters are being installed in lift trucks working in closed environments, the heavy-tonnage BelAZ quarry dump trucks, the LiAZ and LAZ municipal buses and taxis. In the 12th Five Year Plan, such valuable accessories will be provided to the automotive vehicles in Moscow, Leningrad and a number of capital cities of the Union republics and recreation cities of the nation, i.e., places where nonethyated gasoline is used.

There is one other, so to speak, environmental protection reserve: improvement in the technical state of the automobile. More attention must also be devoted to the material-technical support of the repair stations and checkpoints of the truck dispatch agencies, developing new, easy to use, and inexpensive diagnostic instruments. After all, a "clean exhaust" is a matter of human health and protection of our environment.

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RAIL SYSTEMS

DEPUTY MINISTER ON LOCO FLEET DEVELOPMENTS, RELATED ISSUES

Moscow ELEKTRICHESKAYA I TEPLOVOZNAYA TYAGA in Russian No 2, Feb 86 pp 4-7

[Interview with USSR Deputy Minister of Railways Boris Danilovich Nikiforov by V. N. Bzhitskiy, ELEKTRICHESKAYA I TEPLOVOZNAYA special correspondent; date and place not specified: "On the Course of Scientific and Technical Progress"]

[Excerpts] THE JOURNAL'S SPECIAL CORRESPONDENT V. N. BZHITSKIY MET WITH DOCTOR OF TECHNICAL SCIENCES B. D. NIKIFOROV, DEPUTY MINISTER OF RAILWAYS AND USSR STATE PRIZE LAUREATE, AND ASKED HIM TO TALK ABOUT THE WORK RESULTS OF RAILWAY WORKERS DURING THE PAST FIVE-YEAR PLAN AND ABOUT PLANS FOR THE YEARS AHEAD. WE'RE OFFERING THE READERS A RECORD OF THIS CONVERSATION.

[Question] BORIS DANILOVICH, HOW WOULD YOU ASSESS THE OPERATION OF RAILWAY TRANSPORTATION DURING THE PAST 5 YEARS?

[Answer] There is perhaps no simple answer to this question. It's known under what difficult conditions transportation was operating at the beginning of the 1980's. A number of decisive measures were taken by the party and the government to assist railway workers in coping with the increasing flow of freight and passengers. It seriously called for reorganizing methods of economic operation, improving the style and methods of management, raising responsibility for observing labor and industrial discipline, setting up proper moral and material motivation, spreading socialist competition on a wider scale, and intensifying the struggle for traffic safety.

A slight turn for the better was indicated during the 1982-83 period. This trend is generally being maintained now too, although, of course, transportation is operating under very strained conditions.

[Question] THE INDUSTRY'S BASIC OPERATING RESULTS WERE SUMMED UP DURING THE 11TH FIVE-YEAR PLAN. PLEASE ACQUAINT OUR JOURNAL'S READERS WITH THEM.

[Answer] First of all, it should be noted that during recent years railway workers for the first time took up the slack in national economic freight shipments, and during the five-year plan they dispatched freight with a total bulk of 19 billion tons.

Using the occasion, through your journal I wish to thank the railway engineer detachment of many thousands; their assistants; fitters; engineering, technical

and other depot personnel of the electrification industry and repair plants for their vital work.

During these years the passenger turnover grew by 9 percent and totaled 1,791 billion passenger kilometers, and labor productivity increased by 8.1 percent.

As regards capital construction and according to preliminary data, over 3,000 kilometers of new lines were built, including Pogromnoye-Pugachevsk, Agryz-Krugloye Pole, Masis-Nurnus, Kiev-Tripolye, Ledmozero-Kostomuksha, Surgut-the Kholmogorskiy deposit-Pur, and others. Over 4,000 kilometers of second tracks were put into service, nearly 5,600 kilometers were electrified, and over 11,000 kilometers were converted to an automatic block system and traffic control centralization.

[Question] AND WHAT CHANGES HAVE OCCURRED IN THE TECHNICAL CONDITION OF LOCOMOTIVES DURING THE FIVE-YEAR PLAN? HAVE YOU MANAGED TO OVERCOME THE NEGATIVE PHENOMENA AT THE BEGINNING OF THE 1980'S?

[Answer] In general, the situation is improving and the basic indicators that describe the technical condition of electric locomotives and diesel locomotives are now up to standard or close to it. But the thing isn't just figures. It's important to see that it is hidden behind them. There are damages, let's say. As a matter of fact, the number of them is an indicator of the competence of railway engineers and maintenance personnel and the ability to work. And what serious train traffic consequences and malfunctions damages lead to on sections with dense freight traffic! Or the percentage of locomotives that are inspected with a rerun--I would call it an indicator of our good working conditions with high standards of production and the level of organization of our operation.

As a whole, I repeat, the average figures in terms of the network are satisfactory. However, the Ministry of Railways management is extremely worried by the large spread in these indicators in terms of individual railways. For example, things aren't going well with diesel locomotives on the Alma-Ata Railroad and at individual depots of the West Kazakhstan, Odessa, and other railroads. The Sverdlovsk, Southeastern, Gorkiy, Lvov, Azerbaijan, and Kuybyshev Railroads are "distinguishing themselves" in electric traction. The number of damages and unplanned repairs is great on the enumerated railways.

And what's amazing is that frequently the picture is exactly the opposite on adjacent railways! So they come into the depots in different ways for the organization and mechanization of repair, good working conditions with high industrial standards, and personnel training. Incidentally, I'll note that where proper attention isn't being given to studying technical literature, including your journal too, the technical competence level of locomotive brigades and maintenance personnel is low there; first of all, I mean the West Kazakhstan, Alma-Ata, Transcaucasian, and Odessa Railroads, and others.

[Question] THE OPERATING SCALES OF OUR COUNTRY'S RAILWAY TRANSPORTATION ARE UNPRECEDENTED IN WORLD PRACTICE. BUT THEY ALSO DON'T FULLY MEET THE NATIONAL

ECONOMY'S SHIPPING DEMANDS. AND SO, IS IT PROBABLE THAT DURING THE LAST FIVE-YEAR PLAN A QUESTION AROSE ESPECIALLY SHARPLY CONCERNING AVERAGE TRAIN WEIGHT?

[Answer] Indeed, calculations showed that it's necessary to systematically increase train weight in order to assimilate the constantly growing freight traffic. And, for example, if average train weight increased by 158 tons during the 9th Five-Year Plan and by 87 tons during the 10th Five-Year Plan, then it has already increased by 214 tons during the 11th Five-Year Plan.

The task set for the forthcoming five-year plan is like this: to annually increase this indicator by 100 tons and by 1990 to bring it to 3,533 tons. And for this it's necessary to make the driving of connected rolling stock with a weight of 10,000-16,000 tons the norm.

Of course, substantial preparation will be required: needed are scientifically sound principles for driving trains like these; new, flexible manufacturing methods for processing and making up rolling stock; and extension of station tracks. For example, locomotives must have a multiunit remote control system (SMET), radio control and, naturally, high reliability; the railcars need to be more fully utilized and it's necessary to provide for full utilization of their carrying capacity.

A particularly responsible approach of traffic engineers, power engineers, railcar examiners, railway engineers, communications engineers and other workers is necessary towards admitting heavy freight trains.

[Question] MORE EXTENSIVE DRIVING OF HEAVY AND LONG-SECTION FREIGHT TRAINS IS ONE OF THE DISTINGUISHING MARKS OF THE FIVE-YEAR PLAN THAT JUST CONCLUDED. WHAT OTHER ACHIEVEMENTS OF RAILWAY WORKERS WOULD YOU NOTE?

[Answer] First of all, an increase in the pace of shipping on BAM [Baykal-Amur Main Railroad] where operating travel was opened along the entire main line. And although the construction project of the century is continuing, BAM is operating even more assuredly for the country's national economy, and it handled the five-year quota almost 1 month before the deadline. Nearly 67.4 million tons of various freight were shipped here during the 1981-85 period. The shipping pace is increasing literally with each day.

It's impossible not to note also the beginning of regular very high-speed travel between Moscow and Leningrad. Railway workers had to solve a lot of complex tasks: as a matter of fact, unlike foreign high-speed lines our ER200 electric train is operating under ordinary conditions, and not on specialized tracks. They managed to successfully solve a majority of the problems that arose, and right now Riga railcar builders are working on the next scheduled high-speed electric train.

[Question] IN SHORT, SCIENTIFIC TECHNICAL PROGRESS ISN'T BY-PASSING RAILWAY TRANSPORTATION EITHER, IS IT?

[Answer] And how could it be otherwise? High-speed travel is only one of the occasions of transportation retooling that has been promoted, along with

incorporating the latest achievements of science and technology. Of course, work like this was done in previous years too, but all of us are faced with being involved on an especially extensive and large scale with the scientific and technical progress of transportation during the 12th Five-Year Plan and subsequent years. The situation now is such that without this we simply won't be able to achieve a radical turn for the better on railways.

[Question] AN EXPANDED MEETING OF THE MINISTRY OF RAILWAYS COLLEGIUM WAS HELD SHORTLY AFTER A CONFERENCE IN THE CPSU CENTRAL COMMITTEE ON MATTERS OF ACCELERATING SCIENTIFIC AND TECHNICAL PROGRESS IN THE COUNTRY'S NATIONAL ECONOMY [JUNE 1985]. PLEASE TELL US ABOUT THOSE PROBLEMS THAT WILL BE SOLVED DURING THE 12TH FIVE-YEAR PLAN.

[Answer] A fundamental and businesslike conversation occurred concerning which ways to carry out party demands in transportation to successfully assimilate increasing shipments and to improve the effectiveness and quality of work of railway personnel. Specialists see the way out in the necessity to place main emphasis on further retooling enterprises; incorporating new, highly productive technical means and advanced industrial processes for maintaining and repairing them; improving the operation of stations, depots, and other subunits [podrazdeleniye]; and using all resources in a zealous and thrifty manner.

Thus, during the 12th Five-Year Plan the implementation of comprehensive programs for developing and retooling railway transportation for the years ahead will begin in order to create reserves of railway traffic and processing capacity.

The most important part is assigned to scientific research and planning and design organizations, to VUZ's, and to strengthening their link with production. After all, it's no secret that right now the industry's scientific and technical potential is being used by no means in full measure, its output is low, and many scientists' studies conclude only with theoretical computations. Therefore, within the next year or so scientific research institutes and planning and design bureaus will convert to cost accounting when creating, assimilating and incorporating new technology; the personal interest and responsibility of these organizations in achieving high final results was strengthened.

A big problem is putting things in order in capital construction. It's stipulated to concentrate capital investments on the most important projects that determine the traffic and carrying capacity of railways. The modernization of existing enterprises and their retooling are projected. Measures will be implemented that provide for completeness, a reduction in construction time frames, an increase in the quality of construction and installation operations, and complete assimilation of allocated funds.

It's natural that the extensive use of computer technology and advanced economic and mathematical methods for planning and managing shipments, and the automation and mechanization of production processes with the use of manipulators and robotics are provided for in the forthcoming five-year plan. Automated control systems for enterprises and industrial processes will be developed; basically

new, peopleless, resource-saving manufacturing methods will be incorporated; and the workers' moral and material incentive system will be improved.

[Question] YOU NAMED THE BASIC TRENDS OF SCIENTIFIC AND TECHNICAL PROGRESS AS A WHOLE IN RAILWAY TRANSPORTATION. LET'S DWELL AT LENGTH ON THE PROSPECTS FOR DEVELOPING THE LOCOMOTIVE ECONOMY.

[Answer] Events demand that the entire industry, including the locomotive economy too, be reoriented promptly towards a vigorous path of development. What does it mean at this point? First of all, using rolling stock to the maximum extent possible. After all, in principle a reliable electric locomotive in good condition can operate on the average up to 20-22 hours per day, and a diesel locomotive up to 16 hours.

Right now this time is much lower and, therefore, locomotive performance is not very high. To raise it means to lower repair costs, reduce the expenditure of material resources, and avoid unproductive losses of fuel and electrical power.

At the present time, proposals are being developed for a substantial reduction in time frames for the creation of new rolling stock. And, of course, in terms of its technical and operating parameters it must be on a par with the best world models.

[Question] WHAT DESIGN APPROACHES ARE NOW BEING CONSIDERED AS THE MOST PROMISING FOR DIESEL LOCOMOTIVES?

[Answer] If one is speaking about major measures, then first and foremost this is the introduction of 4-stroke diesel engines with 4,000 horsepower, diesel locomotive equipment (switchers at first) with rheostatic brakes, pneumatic starting of diesel engines, devices for heating them at stopping places (for example, by means of a built-in boiler), and others.

It's especially important to note the reference frame suspension of traction engines, which substantially improves the running gear dynamics of both diesel locomotives and electric locomotives. In addition, it reduces rail wear, and that's extremely important with the scale of our shipping and the shortage of high-grade steel.

Built-in (onboard) diagnostic systems on locomotives and external ones at depots are of great importance. The introduction of them can radically change the organization of repair and make it maintenance, at least in terms of objective instrument readings. And, hence, it's a substantial savings of labor and material costs. There's an experience like this in aviation. Our task is to obtain the locomotive industry's fastest equipment with effective diagnostic systems, and the more so as automatic equipment, which it's impossible to check through present methods, will be used even more extensively in rolling stock.

[Question] AND WHAT IS PROJECTED TO CHANGE IN THE DESIGN OF ELECTRIC LOCOMOTIVES?

[Answer] It's necessary to take into consideration that we're faced with assimilating the basic shipping volume precisely with electric locomotives. Therefore, high reliability and good traction engineering qualities are required of them. Besides the reference frame suspension of engines and diagnostic systems it's important to note the contactless, thyristor, sampled-data voltage control on electric locomotive alternating current engines, and, for the long term, separate excitation of direct current traction engines too.

Finally, it's time to introduce collectorless traction engines that would make it possible to solve the reliability problem of wheel and engine units. Various automatic control systems for locomotives are necessary.

The complication is that many locomotive building plants aren't ready for production of electric locomotives like these, and indeed diesel locomotives also. Substantial modernization of their production; the delivery of fully complete, state-of-the-art products; and close contact with scientists are necessary. In short, there are very many problems, but, moreover, it's necessary to solve them at the earliest possible date.

[Question] APPARENTLY, AN INTENSIFICATION OF REPAIR PROCESSES ALSO IS REQUIRED IN ORDER TO INCREASE LOCOMOTIVE PERFORMANCE?

[Answer] Without question. For example, let's examine how production capacities are being used. At the present time, the equipment of locomotive repair plants is operating on an average of nearly 1.5 shifts per day, and the equipment of locomotive depots isn't "holding out" even to a unit. One of the important reserves for increasing labor productivity, especially at depots, is being concealed here: the longer machine tools and other equipment operate the greater the yield of finished products and the better the provision of rolling stock with spare parts. And, consequently, it's possible to relieve repair plants from manufacturing certain types of spare parts and to switch them to the production of more important products.

It's necessary to generally strengthen supervision of the use of depots' machine tool inventory. Facts like these probably will be unexpected for many: for the network as a whole the average capacity of depot equipment is almost 1.5 times greater than at repair plants, and the concentration of capacities per unit of area is 5 times higher respectively. What does this mean? It means that some managers are setting up machine tools "for reserve," but they clearly aren't using them.

On the other hand, it makes sense to get rid of old, obsolete and physically outdated equipment and to purchase new, highly productive equipment. Take the same machine tools with computer numerical control. They've now become quite "flexible" and easily adaptable for the production of even small batches of components.

[Question] CONSEQUENTLY, ARE THE INTENSIVE MANUFACTURING METHODS IN REPAIR PRODUCTION THE SAME ONES THAT EQUIPMENT IS USING CLOSE TO ITS TECHNICAL POSSIBILITIES?

[Answer] Not only that. One more component of intensifying production is the mechanization of repair processes. It must be at a level of 80-85 percent. Right now on an average for the network this indicator is considerably worse. Although we have "standards" towards which it's necessary to compete. I have in mind the depots of Moskovka, Solvychevodsk, Krasnyy Liman, Osnova, Zhmerinka, Kurgan, Dema and others. Incidentally, even capital repair of KR-1 locomotives by some depots is completely within their competence.

The extensive use of production and assembly lines, various testing stands, small-scale mechanization facilities, manipulators and other equipment; its better utilization; and certification of work places towards conformity to the current achievements of scientific and technical progress--all these will make it possible to systematically reduce the number of workers who are engaged in manual labor and to improve working conditions. And, consequently, to raise labor productivity dramatically.

Retooling and repair modernization groups must be at each depot and at each repair plant. One of their tasks is to make it so that work places meet the highest requirements and coordinate with an enterprise's computer complex. Relationships between shops, sections and other subunits must be built through computers and not "through legs."

And even as soon as we began to speak about manufacturing methods, I'll note that during the 12th Five-Year Plan the Ministry of Railways will develop and introduce on the basis of advanced plants, depots, and other enterprises highly effective industrial processes and gear and equipment for the production and restoration of spare parts with toughening and protective coatings. For example, this means gas plasma spraying, corrosionproof protection, and others.

In connection with this I want to emphasize that railway personnel aren't giving proper consideration to the achievements of modern chemistry. And, as a matter of fact, quite a number of interesting developments have appeared there and by means of which we could manage to solve many problems with the insulation of current-carrying parts and protection from corrosion and create effective detergents, good lubricating and structural materials, and so forth. VUZ chemists aren't participating in the retooling of transportation. In short, the chemicalization of transportation, if it can be expressed in that manner, is a large untapped reserve.

[Question] EACH YEAR THE DEMANDS INCREASE FOR EXPENDING FUEL AND ELECTRICAL POWER IN AN ECONOMICAL MANNER. PLEASE NAME SOME LONG-TERM WAYS FOR ECONOMIZING POWER RESOURCES.

[Answer] It isn't necessary to speak about the enormous importance of this problem. The party and the government are raising the question this way right now: railway personnel must assimilate increasing shipments and increase train speed without involving additional power resources, and only by virtue of the industry's internal reserves.

And this is correct. Unproductive losses of fuel and electrical power are too great in our country. Very likely the basic source for economizing them is

concealed in an improvement of shipping processing methods and the organization of traffic. How many power resources we lose because of malfunctions in traffic, delays at inhibit signals, failure to execute the section speed, the idling of diesel locomotives, incomplete loading of rolling stock, and auxiliary runs of locomotives! I'm sure that if we could manage to eliminate just these losses, then we could more than exceed the quotas for economizing.

And what a large reserve is hidden in the design of locomotives! Only by improving the parameters of diesel engines is it possible to reduce fuel consumption by 10-15 percent. The conversion of diesel locomotives to liquefied gas and equipping them with circuits and units for fuel economy during stops, idling, rheostatic testing, and so forth are promising.

In electric traction, of course, this is regeneration of electrical power and continuous, contactless voltage control. Measures on economizing electrical power for auxiliary needs are being delayed groundlessly.

As the Omsk scientists are recommending, it's important to make it a wider practice to switch off a portion of traction engines when they're traveling with a partial load. Experience has confirmed the correctness of their developments, especially when on the South Urals Railroad they began to drive rafts of electric locomotives with a multiunit remote control system. Apparently, it makes sense to create similar approaches for diesel locomotives too.

The experience of the Moscow-Ryazan department where they developed a resource-saving processing method for admitting trains is interesting. And what is extremely important is that here they were able to include all related services in the struggle to economize fuel and electrical power.

By no means did I enumerate all the ways to economize power resources. The main thing is to learn to be the boss at your enterprise and to more boldly and actively incorporate the recommendations of scientists and the achievements of innovators.

[Question] TO LEARN TO BE THE BOSS AT AN ENTERPRISE--THESE ARE VERY PRECISE WORDS THAT REFLECT THE ESSENCE OF THE PARTY'S ECONOMIC POLICY DURING THE PRESENT STAGE. AN IMPORTANT PART IN THIS PROCESS IS ASSIGNED TO IMPROVING THE ECONOMIC MECHANISM. WHAT MEASURES ARE PROJECTED IN THE MINISTRY OF RAILWAYS WITH A VIEW TO MORE FULLY USING THE HUMAN FACTOR OF ECONOMICS?

[Answer] A difficult task stands before railway personnel: during the 12th Five-Year Plan to create an integral, effective system of management and administration that is based on maximum use of scientific and technical progress. By means of a system like this it will be possible to expand the independence and responsibility of transportation enterprises, to actively use more flexible forms and methods of management and cost accounting, and to stimulate the initiatives of labor collectives.

The useful experience of a thrifty attitude towards the matter is already accumulated now on some railroads. First of all, I'll note the Belorussian Railroad where an economic experiment is in progress. This year it will be extended to

eight more railroads: the Baltic, Odessa, Moldavian, Southern, North Caucasus, Lvov, Alma-Ata, and Central Asian.

[Question] RE-EQUIPPING THE INDUSTRY, IMPROVING THE ECONOMIC MECHANISM, AND OTHER MAJOR MEASURES WITHIN THE NEXT FEW YEARS WILL ALLOW RAILWAY TRANSPORTATION TO BE RAISED TO A HIGHER LEVEL. WITH WHAT TASKS ARE WE FACED WITH COPING DURING THE 12TH FIVE-YEAR PLAN?

[Answer] I'll say it bluntly: very substantial work awaits us. The 27th CPSU Congress will approve the final figures. For the time being, by 1990 it's projected by the draft of basic trends to increase the shipping volume of freight by 8-10 percent and passenger flow by 7-9 percent and to raise the average weight of a freight train by 500 tons. It's stipulated to increase labor productivity of workers who are engaged in shipping by 10-12 percent. Shipping cost must be reduced substantially.

A total of 2,300 kilometers of new lines will be put in operation, no less than 4,000 kilometers of second tracks will be built, 8,000 kilometers will be electrified, and over 15,000 kilometers will be converted to an automatic block system and traffic control centralization.

The travel speeds of passenger trains will be increased to 140-160 kilometers per hour on lines with a length of more than 10,000 kilometers and up to 200 kilometers per hour on sections with a total length of 900 kilometers.

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MARITIME AND RIVER FLEETS

DIRECTOR ON BALTIC DESIGN BUREAU WORK

Moscow MORSKOY FLOT in Russian No 1, Jan 86 pp 44-45

[Article by V. Reznikov, director of the Baltic Central Planning and Design Bureau under the rubric "Science for Production": "The Design Bureau Serves the Fleet"]

[Text] The Baltic Central Planning and Design Bureau [TsPKB] was created 40 years ago in order to provide planning and technical documentation for production of maritime equipment.

Today the bureau works in the area of automating production processes on vessels and in ports, ensuring safety of navigation, improving the organization of the fleet's work, technology of shipping and handling cargo, mechanizing loading and unloading operations, operation of the fleet and port equipment, improving the organization and technology of work at ship repair yards, and developing technical equipment of the maritime fleet.

The solutions adopted for accomplishing the tasks set forth by customers often are unique not only in our country, but abroad as well. For many years the bureau has remained the only organization in the sector developing and manufacturing radio beacons, control equipment, and navigation automation equipment, primarily for ensuring year-round navigation in hard to reach areas of the Far North. In recent years radio beacons with a range of up to 150 miles have been developed. They are reliable and economical.

The Baltic TsPKB has also developed a set of automatic instruments and devices for controlling beacon equipment (equipment for controlling powerful lights, a system for ensuring automatic operation of radio beacons in a group or independently, and flashing devices) which has made it possible to reduce labor costs considerably and gain an annual savings of up to 1 million rubles. The main designers of this equipment were engineers L. Kiylo, A. Semenov, and V. Sobolev.

The bureau has developed a laser beacon which, unlike light beacons and range markers, have a higher precision.

The high level and topicality of the bureau's developments are corroborated by the Exhibition of USSR National Economic Achievements medals, inventor's

certificates, and certification of industrial products for the highest quality category received by our workers.

Emergency and operational ship radio communications instruments have been developed by the enterprise and are in series production, such as the automatic radiotelegraph alarm signal receiver which receives signals regardless of the presence of a watch on the vessel. The receiver is conventional equipment and meets IMO, VAKR-74, and SOLAS-74 requirements.

Taking into account the development of maritime satellite radio communications, in recent years the bureau has started putting fundamentally new products into production. The first of them was a satellite radio communications channel simulator stand which makes it possible to reproduce actual radiowave propagation conditions in a communications link: free-floating emergency radio-buoy -- earth satellite -- coastal center. The work is being conducted jointly with the Central Scientific Research Institute of the Maritime Fleet and institutes of other departments.

One direction of our bureau's work is the automation of production processes on vessels for increasing their profitability, ensuring safety of navigation, improving the working conditions of seamen, and lowering the accident rate and traumatic injuries.

The objects of automation mainly are mechanisms and propulsion systems. In recent years we have developed and introduced systems for controlling the main propulsion engines, auxiliary boilers, and compressed air compressors; heavy fuel viscosity regulators; alarm and warning systems. The introduction of these devices on many vessels has provided for an unmanned watch in the engine room at anchorage and a reduced watch in transit.

Experimental and pilot models of automation equipment get their start in life thanks to the close creative cooperation of bureau specialists and production workers--the workers of ship repair yards and technical service bases and crews of the vessels. Often this cooperation, such as that with the crew of the motor boat "Kingisepp" of the Baltic Shipping Company for example, continues fruitfully for many years. During the 11th Five-Year Plan alone, integrated and local automation systems were incorporated on 130 vessels of the Baltic, Lithuanian, Northern, Sakhalin, and other shipping companies. The savings from their incorporation amounted to about 2.5 million rubles.

In recent years specialists in the field of automation have concentrated their efforts on developing equipment to perform more complex tasks--diagnosing and optimizing the operation of the main propulsion engines and other ship equipment. This equipment is being developed based on the latest achievements of science and technology, including microprocessors.

Work to automate vessel machinery and mechanisms is being conducted under the supervision and with the direct participation of engineers N. Polishchuk, S. Vasilyev, V. Dimanis, N. Biryukov, and others. Instruments and systems of automation, communications, and navigation equipment are fabricated at the bureau's own experimental base.

With active participation by specialized enterprises and also the Leningrad, Riga, Ilichevsk, Kaliningrad, and other ports, universal hoisting mechanisms for loaders and cranes, container forks for large-capacity containers, and slings for packaging have been developed.

In the last 2 years alone, series production of 15 types of products developed by the bureau has been set up. Ports have received hundreds of hoisting mechanisms and thousands of slings whose use has provided an annual savings of about 1 million rubles.

Often the bureau has to resolve operational problems for transporting, arranging, and securing unique heavyweight cargo and for increasing the carrying capacity of vessels. Thus, for example, jointly with port workers and seamen we resolved problems of transporting floating and shore-based grain reloaders with an assembled weight of 350 tons on vessels of the "Stakhanovets Kotov" type, which made it possible to reduce to a minimum the start-up work for putting this highly productive equipment into operation at the Leningrad, Odessa, and Novorossiysk ports.

The bureau's suggestions for transporting heavyweight and bulky cargo weighing between 70 and 160 tons to developing countries made it possible on the average to double and triple the carrying capacity of vessels.

Close links with the operators and manufacturers of the equipment and effective resolution of problems on site made it possible to find the optimum variant for loading the 410-ton tug "Mars" on a vessel in the port of Odessa for shipment to the customer.

The Baltic TsPKB has developed a complete set of design and production documentations for manufacturing roll-trailers. The active participation of bureau specialists in preparing this production and contact with the Caspian Sea of the State Scientific Research, Planning and Design Institute of Maritime Transport helped the ship repair yard to bring a specialized shop to the planned capacity quickly.

For about 10 years the bureau has been analyzing the needs of steamship lines for spare parts for internal combustion engines and the capabilities of ship repair yards for manufacturing them. To increase the quality and expand the production of spare parts, the bureau developed and incorporated advanced production processes, rigging, and special production and testing equipment. Thus, for example, a set of universal testing equipment was developed and introduced for production of fuel equipment, ensuring a metrological basis for production of precision pairs. Advanced technology was developed and introduced for manufacturing fuel equipment units on the basis of modern automated production at the Odessa Ship Repair Yard imeni 50-letiya Sovetskoy Ukrainy. Work in this area not only yields great economic benefits, but also improves providing the fleet with high-quality spare parts.

On technical recommendations of the bureau, a network of shore bases for operational repair of fuel equipment has been created and equipped right in the shipping companies. In recent years this work has been conducted with

repair yards based on comprehensive joint work programs calculated for a 5-year period and longer term.

The bureau participated in developing a process for centrifugal casting of main cylinder sleeves 760 and 900 mm in diameter. The quality of main cylinder sleeves 300 and 430 mm in diameter has been increased, and the number working on production of these parts has been reduced.

Jointly with the Zhdanov and Nakhodka ship repair yards, bureau specialists set up production of main cylinder covers 570 mm in diameter from high-strength cast iron using their own process of molding and smelting. With the participation of foundry hands, the bureau cast more than 50 covers. Work is being conducted jointly with the Krasnaya Kuznitsa Ship Repair Yard for casting sleeves for four-stroke engines using conversion cast iron instead of the very scarce foundry pig iron and also for finish machining of these sleeves.

One of the directions of the bureau's activities is the development of documents for improving operation of the fleet. During the past 5-year period standards were developed for permissible wear and deformations of the main hull designs for 389 vessels of 15 shipping companies. In addition, a reduction in the ice category was justified for several types of vessels of the Baltic Shipping Company, which made it possible to operate the fleet without repairing the outer plating. The use of special standards developed by the bureau makes it possible to simplify and accelerate the troubleshooting process substantially, reduce the amount of repairs to hull structures, and predict the volume of hull repairs, the requirement for metal, and labor costs for the forthcoming period, that is, it results in a savings in material and labor costs and regulating repair planning. In 1983 alone these standards were used in the repair of 60 vessels of 10 shipping companies, which yielded a savings of 2.2 million rubles.

In 1978 the Baltic TsPKB began drawing up maintenance requirement cards for the basic types of vessel deck work. Today they are used by nearly all steamship lines, directorates, and enterprises having a fleet. The cards take into account the peculiarities of vessel equipment, suggest the optimum sequence for performing production operations, the number and arrangement of workers, recommendations for observing safety measures when performing the work, and take into account the experience of leading crews, navigation service specialists, and other organizations. Every crew member working with a maintenance requirement card knows that it has been developed specifically for his vessel in order to perform certain work better, more quickly, and more safely.

Carrying out the party's decisions on accelerating scientific and technical progress, increasing production efficiency, and saving material resources, in the 12th Five-Year Plan the Baltic TsPKB collective will develop new progressive energy and material saving processes in manufacturing and reconditioning spare parts for vessel equipment, create the most perfected automatic radio beacons and other navigation aids and automated maritime radio communications equipment, and develop new means for mechanizing cargo processing at seaports and developing means for automation and technical

diagnostics of mechanisms and vessel propulsion plants, and in other areas of engineering and design activities aimed at improving maritime transport.

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MARITIME AND RIVER FLEETS

NEW SYSTEM REMEDIES RIVER FLEET COMMAND PERSONNEL SHORTAGE

Moscow VODNIY TRANSPORT in Russian 4 Mar 86 p 3

[Article by N. Chepov, captain-mechanic, standby operator of the motor boat "Perm" of the Volga-Don Shipping Company: "A Useful Innovation"]

[Text] The shortage of personnel on cargo vessels, above all captains and first navigators, has been especially sharply felt in recent years on the Don. The extension of the navigation period and the lack of a reserve of senior commanders has resulted in a large indebtedness for labor leaves and compensatory leaves. It is not surprising that many are leaving the cargo vessels for the local fleet or for shore subunits of maintenance and operation bases.

At the proposal of the captains, the personnel departments of the Volga-Don Shipping Company and the Rostov Maintenance and Operation Base "Krasnyy Flot" have thoroughly studied questions of improving the organization of labor and rest of captains and first navigators on cargo vessels. They closely studied the experience of the Latvian Maritime Shipping Company and the local standby method. They developed and tested a new standard schedule for cargo vessel crews. The crews of two motor boats, the "Nakhichevan" and the "Spassk," began an experiment in 1984. Five vessels of project 21-88 joined them in 1985. Three of them operated on a complex line in the within the confines of the shipping company, and two operated on the Rostov-Moscow-Rostov route.

The results of the experiment made it possible to draw a conclusion on the possibility of its widespread use in the cargo fleet. Crews were able to maintain the vessels in the proper technical condition and received excellent marks according to results of inspections. Every month they all overfulfilled the production plans and had no down time due to personnel shortages or for technical reasons.

Just what is the essence of this innovation?

The crew composition looks like this: the captain-mechanic--standby, the mechanic--standby captain, the first navigator--first assistant mechanic (two), the second navigator--second assistant mechanic, the assistant mechanic for electrical equipment, the senior motor mechanic-helmsman, the motor mechanic-helmsman (three), and the cook.

This has made it possible to organize the labor of the ship handlers on a 3+2 arrangement, that is, three are constantly on the vessel and two are on compensatory leave. They work a 10-hour navigation watch schedule: the captain (or standby)--10 hours; the first navigator--10 hours; the second navigator--4 hours. In addition, the captain and the first navigator are to spend 2 hours each and the second navigator is to spend 3 hours on technical servicing of the vessel's propulsion plant, and if necessary to assist the second navigator (passing difficult sectors, sluicing, maneuvers, and so forth) they use these hours to cover the watch of the second navigator.

The second navigator may also be granted compensatory leave provided that the duties of senior motor mechanic-helmsman are carried out by a licensed third navigator.

The brigades working on the local line are changed regularly every 15 days. On the vessels operating on the Rostov-Moscow-Rostov route with a round trip of 20-25 days, they decided to increase the brigade's work period to the length of the complete round trip and conduct the changeover at Rostov.

The rest of the crew members have a normal workload (a 7-hour work day). Therefore, based on the specific work conditions and the full strength of the staff, with concurrence of the rank and file the administration can employ the 3+1 arrangement, that is, three motor mechanic-helmsmen have an 8-hour schedule and one is on compensatory leave.

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MARITIME AND RIVER FLEETS

GENERAL DIRECTOR ON V/O SUDOIMPORT ACTIVITIES

Moscow VODNYI TRANSPORT in Russian 1 Mar 86 p 3

[Interview with Oleg Sergeyevich Kropotov, general director of the All-Union Association Sudoimport; date and place not given: "Oriented to the Future"]

[Text] "Our foreign economic activities must also be linked with new tasks. The approach to mutually beneficial economic ties must be large-scale and oriented to the future," the Political Report of the CPSU Central Committee to the 27th CPSU Congress points out.

This also pertains most directly to activities of the All-Union Association (V/O) Sudoimport. The editorial staff asked Oleg Sergeyevich Kropotov, director of the association, to talk about its work.

[Question] Please tell us what the V/O Sudoimport is engaged in?

[Answer] The V/O Sudoimport is the only organization included in the Ministry of Foreign Trade which specializes in the import and export of vessels and other floating craft, including technical means for oil and gas exploration and development of the continental shelf, various maritime equipment, spare parts for it, and also services for repair and maintenance of vessels. It was created as an independent foreign trade association in 1954; but to be precise, it was reactivated after approximately a 20-year interval.

Beginning its activities with import operations, Sudoimport also soon became known in the world market as an exporter of vessels, maritime equipment, various floating craft, and a variety of services. Today its trade partners include up to 100 foreign trade organizations of socialist countries and more than 700 firms of industrially developed capitalist countries and developing countries--in all from 80 countries of the world.

Soviet buyers of the V/O Sudoimport import products list goods include the ministries of the maritime and river fleet, the fish industry, the petroleum, gas, and shipbuilding industries, and transport construction, the State Committee for Hydrometeorology and Environmental Control, the USSR Academy of Sciences, the Committee for Physical Culture and Sports....

[Question] What role does socialist integration within the framework of CEMA play in Sudoimport's work?

[Answer] It would not be an exaggeration to say that the V/O Sudoimport largely owes its revival precisely to the increase in the role of economic integration and specialization in the output of specific types of products and the broad cooperation in the production of vessels, maritime mechanical and other equipment among the countries of the socialist community. In the course of recovery of the national economy after the Great Patriotic War there occurred not only an intensive revitalization but also a technical re-equipment of shipbuilding enterprises.

Parallel with the revival of domestic enterprises, Soviet shipbuilders also did much so that other countries embarking on the path of building socialism could set up their own modern shipbuilding enterprises. A variety of assistance was given to these countries, ranging from training specialists to giving mutually beneficial orders for building vessels for the USSR. During this period the foundations were laid for future cooperations of socialist countries in the area of shipbuilding, which was especially helped by the formation of the Council for Mutual Economic Assistance (CEMA) in 1949. In the course of joint work, the specialization of each of the CEMA member-countries was determined for building vessels, floating craft, and maritime equipment.

Thus, for example, the People's Republic of Bulgaria specialized in building mixed navigation tankers, vessels for bulk cargo with a dead weight of 25,000 tons, container carriers with a dead weight of 12,000 tons, and floating fuelers and repair shops on reinforced concrete hulls.

A wide variety of vessels of many classes are built at shipyards of the German Democratic Republic. Recently for USSR orders they assimilated production here of "ro-flow," "lo-ro," as well as "ro-ro" types of vessels for river-sea shipments.

The Polish People's Republic is a major supplier of vessels to the USSR and other CEMA member-countries. Its shipbuilders have specialized in building large-capacity oil and ore carriers with a dead weight of over 100,000 tons, big vessels for hauling bulk cargo, large vessels with horizontal loading, and many others. Since the early 1970's, production of sports vessels, pleasure sailboats and motor boats has been assimilated and developed here.

The Socialist Republic of Romania specializes in building relatively small dry-cargo and tanker vessels with internal and mixed navigation and tankers for the Caspian Sea.

The Czechoslovak Socialist Republic builds various suction-tube dredges and dredge pumps, floating pumping stations, comfortable passenger river vessels, and mixed navigation dry-cargo ships for orders from the USSR and other CEMA member-countries.

Beginning with building a series of "Tissa" type small dry-cargo ships for the USSR, shipbuilders of the Hungarian People's Republic subsequently specialized in building floating cranes, pusher tugs for operating on the Danube and rivers of Siberia, and other small vessels.

The association also has long-standing ties with the Yugoslavian shipyards which build many types of vessels for the USSR, including railway ferries.

In turn, the Soviet Union supplies CEMA member-countries and the SFRY vessels of the widest variety and purpose and other floating craft produced by our industry.

The work on mutual cooperation is structured on the basis of long-term planning, which enables each individual country to improve its production and reduce production costs not only for itself and its CEMA partners, but also for exporting to industrially developed capitalist and developing countries. The CEMA shipbuilders have been completely spared from the crisis in shipbuilding which has been making itself felt especially sharply in recent years.

[Question] With what capitalist countries does Sudoimport maintain continuous contacts in shipbuilding and ship repair?

[Answer] Although socialist countries account for up to two-thirds of the V/O Sudoimport's goods turnover, the association also maintains extensive business ties with firms of other countries, including industrially developed capitalist countries. The V/O Sudoimport has long had business relations with Finnish shipbuilding firms. They supply the USSR with various sizes of seagoing and river ice-breakers, dry-cargo and tanker vessels for navigation in the Arctic, "ro-ro" ships, transport barges, motor vehicle and passenger vessels, scientific research ships, and so forth. The leading position in these deliveries is held by the firms "Wartsila," "Valmet," "Rauma-Repola," and "Hollming," and in the area of vessel equipment it is the firm "Navire."

Among the firms of other countries, one should note our association's long-standing business relations with the Austrian firm "OSVAG" (the Lienz-Korneuburg Shipyard), the Dutch firm "IKhts Smit," the Japanese firms "Ishikawajima Harima" and "Fukushima Kashiteru," and Spanish, Italian, Danish, Swedish, and other firms.

It should be noted that the V/O Sudoimport not only imports vessels and floating craft from industrially developed capitalist countries, but also exports domestic shipbuilding products to these and other countries.

In all since 1960 the association has exported several hundred vessels of all kinds with a total dead weight of more than 2.5 million tons. The association exports maritime equipment to more than 35 countries which include not only CEMA member-countries and the SFRY, but also Great Britain, Holland, Italy, the FRG, Finland, France, Japan, and many others.

[Question] To what extent do the developments of Soviet scientists and designers influence the orders of Sudoimport?

[Answer] The affect it, without a doubt. First of all, the development and assimilation of production of new types of vessels and maritime equipment, as well as new production processes at domestic shipyards make it possible to increase exports and reduce expenditures for imports. Secondly, new opportunities open up for selling engineering and process developments, but this is already the sphere of activities of another association "Litsenziortorg" (for example, the Italian firm "Astano" acquired a license for a new shape of bow lines in the USSR which markedly increases the cruising speed of vessels). Thirdly, the developments of our designers and scientists help increase the quality of vessels, including those ordered abroad. Thus, for example, in building hulls of the "Taymyr" type nuclear-powered ice-breakers in Finland, the firm "Wartsila" will use special highly cold-resistant steel purchased in the USSR, which is considerably superior in all properties to the best foreign types.

[Question] Tell us about the outlook for the association's work.

[Answer] Entering the new 5-year plan, the V/O Sudoimport collective is examining the prospects of its forthcoming work in light of the tasks for development of foreign economic ties set forth by the 27th CPSU Congress. In particular, they call for comprehensive development and enrichment of the economic cooperation with fraternal socialist countries, expanding integration within the framework of CEMA, cooperation with developing countries, and developing on a mutually beneficial and equal basis stable trade, economic, and scientific and technical ties with interested capitalist countries.

There is also the task to improve the structure of trade with foreign countries, primarily by increasing the sale of machines, equipment, and other products with a high degree of redesigning. To carry out this task, the association is faced with a large amount of joint work with enterprises of other ministries and departments.

In the sphere of import operations, we are faced with much work to renovate the country's maritime transport, fish industry, and river fleet and replenish it with a very wide variety of highly productive and economical vessels and floating craft.

The V/O Sudoimport collective is determined to carry out with honor the tasks set forth by the 27th CPSU Congress, contribute as much as possible to speeding up scientific and technical progress, and make its contribution to strengthening the economic might of our Motherland.

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MARITIME AND RIVER FLEETS

BRIEFS

SAIMAA CANAL SHIPPING GROWTH--LENTASS--Dynamic growth of shipping, appearance of new ships on the line, and extension of shipping seasons are characteristic operating features of the Saimaa Canal, which has connected Finland's inland areas with the Baltic Sea. The number of cargoes being delivered by it annually has passed the million mark. The route has become the most important link in a transport network, through which servicing of the friendship bridge between the USSR and Finland is effected by the most economical river transport. [However,] the navigable system has frozen until spring on the canal--the last ships, leaving Finnish harbors, have headed for the open sea. Navigation-85 [the 1985 shipping season], prolonged because of the warm weather of recent days, has ended on the route. On the occasion of the end of operations, a meeting of USSR and Finnish representatives for Saimaa Canal matters was held in Vyborg. Results of the shipping season and tasks for the future were discussed. Specifically planned is an increase in the shipping of lumber, coal, liquid fuel, paper, and diverse equipment and machines. Intensification of the waterway system will promote further development of the new transshipment complex, intended for servicing Saimaa Line ships, in the Vyborg maritime port. Shipping on the route will increase because of the switching from loaded railroads to the water highway of part of the freight being delivered, which will provide for the freeing of railroad cars and an increase in handling capacity of border railroad stations and track stages. [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 29 Jan 86 p 3] 12319

RO-RO 'BREST' IN SERVICE--A new, multipurpose Astrakhan-class ship, automation class A-2, RO-RO series, built at the Warnemunde Shipyard in the GDR [German Democratic Republic], has begun operating in the Black Sea Maritime Shipping Company's fleet. So far, there are three such ships in all in the ChMP [Black Sea Maritime Shipping Company]. Naturally, there is not a lot of experience in operating them. Nevertheless, the Brest's crew is doing all it can to justify the great confidence placed in it, having been entrusted with accepting the new motor ship from the GDR shipbuilders and operating her. Despite the large volume of work connected with the final stage of accepting the ship, the crew has, at the same time, provided for the loading of two large "Atlant"-type gantry cranes for Port Yuzhnyy, and two more cranes will be loaded upon arrival in Port Rostok, after taking on material and technical supplies in Port Klaypeda. [By First Mate L. Gayevskiy] [Excerpts] [Moscow VODNIY TRANSPORT in Russian 30 Jan 86 p 1] 12319

VARIOUS RECENT SHIP LAUNCHINGS--In the new 5-year plan, the country's maritime fleet will be augmented with specialized, highly automated ships for various purposes. In honor of the 27th Party Congress, the country's shipbuilders have launched several ships ahead of schedule and delivered them to the fitting-out wharf. With schedule stepped up by a month and a half, a new motor ship with the horizontal loading method, the Aleksandr Starostenko (Ivan Skuridin-class), has left the ways of the Leningrad Shipbuilding Plant imeni A.A. Zhdanov. The next motor ship of the Khariton Greku-class series of bulk cargo ships, the Akademik Blagonravov, 52,700 tons deadweight, has been taken from a dock of the Nikolayev "Okean" Plant half a month ahead of planned schedule and delivered to the fitting-out wharf. The tanker Aleksey Nesterenko, 25,000 tons deadweight, has been launched ahead of schedule from the ways of the Association imeni 60-letiya Leninskogo Komsomola [60th Anniversary of the Leninist Communist Youth League]. The Kherson shipbuilders have started a new series with this lead ship. Ahead of schedule, on the very eve of the Congress, the atomic-powered lighter-container carrier [LASH and container ship] Sevmorput [Northern Sea Route] was taken from a dock of the Kerch "Zaliv" Plant imeni B.Ye. Butoma. The ship will enter the Murmansk Maritime Shipping Company's fleet ranks in 2 years. [Article from VODNYY TRANSPORT's own information: "The Fleet of the New 5-Year Plan"] [Text] [Moscow VODNYY TRANSPORT in Russian 27 Feb 86 p 3] 12319

'KOMPOZITOR MUSORGSKIY' FOR BALTIC--A new ship, Kompozitor Musorgskiy, has entered the Baltic Maritime Shipping Company. She is intended for transporting motor vehicles, wheeled road equipment, and international standard containers. The motor ship's length is 126 and her beam 16 meters. A low superstructure permits her to call at river mouths. In motor ship Kompozitor Musorgskiy are two main diesel engines, each of 3,600 horsepower. The ship can develop a cruising speed of 16.2 knots. Both the main engines and the diesel generators are able to run on the inexpensive, heavy sorts of fuel. Unattended operation is intended for the mechanisms in the engine room, control of which is effected from a central station. The motor ship is equipped with a stopped and low-speed maneuvering system at the bow--this significantly improves the ship's maneuvering characteristics and facilitates her handling when mooring in small ports. [By V. Yeliseyev] [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 1 Feb 86 p 1] 12319

PADDLE-WHEEL RIVER SHIPS DESIGNED--TASS--Paddle-wheel motor ships on the rivers.... The RSFSR Ministry of the River Fleet's Central Engineering and Design Bureau specialists consider such a prospect promising. In solving the problem of creating ships for the small rivers of Siberia and the Far East, the Leningrad engineers have determined the basic requirements that these ships must meet: relatively small size, maneuverability, and ability to move in shallow water. However, at depths less than half a meter, the efficiency [useful action coefficient] of the screw and water-jet propeller drops sharply. With what, then, are these to be replaced with an extremely shallow draft? And then the designers proposed returning to the old-fashioned paddle wheel, which many people probably can judge only by the famous film comedy "Volga-Volga." Experiments showed that a stern wheel providing smooth and gentle motion can

produce the greatest effect at minimally shallow depths. The designing of a paddle-wheel pusher tug was begun at the design bureau. It is intended for "extensive navigation" along small rivers, where the innovation will make its appearance as early as the end of the 5-year plan. The barges intended for this kind of navigation also will be special. They, too, are being designed as shallow-draft, with folding ramps over which cargoes from the holds will be delivered directly to the river bank. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 4 Feb 86 p 1] 12319

'ISKATEL-2' RESEARCH CATAMARAN--The Iskatel-2-class catamaran, aboard which specialists of the Visla Shipyard at the center of Polish shipbuilding, Gdansk, have begun equipment installation, initiates a new series of research ships for the USSR. Engineers of the Gdansk "Prorem" Design Bureau developed the technical documentation of the modern ship for research in the Soviet Union's shallow coastal waters under "Shelf" Program auspices. The catamaran, the length of which is about 50 meters, will be the largest maritime ship made at the Visla Shipyard, heretofore having specialized in building fishing seiners. The up-to-date equipment and special EVM [computer] on board, as well as the design of both hulls, will permit the Iskatel to conduct effective investigations of waters and sea bottom even in stormy weather. Visla will build four catamarans of this series in all, the first of which is planned to be turned over to the clients during the second half of the current year. [Text] [Moscow VODNYI TRANSPORT in Russian 6 Feb 86 p 1] 12319

TANKER 'KAPITAN YERSHOV' LAUNCHED--Nakhodka--A new tanker of the Maritime Kray Maritime Shipping Company is named in honor of Captain V. Yershov, well known in Nakhodka. The motor ship, constructed by Yugoslavian shipbuilders, was launched at the end of last year. The ship's cargo capacity is 15,000 tons. A high degree of mechanization and automation, excellent living and recreation conditions for the crew, and outfitting with up-to-date navigation equipment--these characteristics the seamen have appreciated. The tanker Kapitan Yershov will make her first voyage to countries of Southeast Asia. [Text] [Moscow VODNYI TRANSPORT in Russian 11 Feb 86 p 1] 12319

'STANISLAV YUDIN' CRANE SHIP--A powerful crane ship, the Stanislav Yudin, has been built for the Soviet Union at the "Vyartsilya" A/O [Joint Stock Company] Shipyard in the city of Turku (Finland). Installed on the ship is a crane manufactured by the "Kone" A/O, which is capable of lifting a load weighing 1,600 metric tons to a height of 60 meters with a boom sweep of 48.5 meters. The ship's length is 183.4 meters, beam 36 meters, draft 8.9 meters, speed 12 knots, crew 120 persons. The ship's power plant is diesel-electric; propulsion is effected by three "Vyartsilya-Vaasa" 12V22 diesel engines with overall power of 12.28 megawatts (16,710 horsepower). During operation at depths up to 300 meters, the ship can maintain constant position even in the event of considerable wind and roughness of sea. This is ensured by means of eight anchors, each weighing 10 metric tons, with enhanced holding power. Control of the

ship's attitude during cargo operations is effected by a specially developed EVM [computer]. The ship is equipped with a system for conducting underwater operations at depths up to 50 meters, as well as a pressure chamber. There is a landing pad intended for helicopters of the Mi-8 type. This ship, which is one of the largest in the world by lifting capacity, height of lift, and sweep of boom, is intended for development of underwater oil and gas deposits. Previously, this shipyard has built for our country several crane catamarans of 600-metric-ton lifting capacity, which also are some of the largest in the world. Now a crane ship of another type, and even greater lifting capacity, is being developed at the shipyard in Turku. [Unattributed article: "Crane Giant"] [Text] [Moscow MORSKOY FLOT in Russian No 2, Feb 86 p 52] [COPY-RIGHT: "MORSKOY FLOT", 1986] 12319

CSO: 1829/97

PORTS AND TRANSSHIPMENT CENTERS

CONFERENCE ON IMPROVING USE OF CONTAINERS, PALLETS

Moscow VODNYI TRANSPORT in Russian 24 Dec 85 p 2

[Article by S. Mikhalev: "Freight in Pallets and Containers" under the rubric TTS Experience and Problems; capitalized passages published in bold-face]

[Text] "THE DEVELOPMENT OF CONTAINER AND PALLET SHIPMENTS IN WATER TRANSPORTATION." THIS WAS THE SUBJECT OF AN ALL-UNION CONFERENCE, ORGANIZED BY THE CENTRAL ADMINISTRATION OF THE SCIENTIFIC TECHNICAL SOCIETY OF WATER TRANSPORT.

THE PRESIDENT OF THE ADMINISTRATION, DEPUTY MINISTER OF THE MARINE A. GOLDOBENKO, ADDRESSED THE ASSEMBLY WITH THE OPENING WORDS.

REPORTS WERE GIVEN BY THE PRESIDENT OF THE ALL-UNION MORKONTEYNER ASSOCIATION, M. KURBATOV, DEPUTY DIRECTOR OF THE MAIN FLEET OF THE MINISTRY OF THE MARINE, V. KURILENKO, DIRECTOR OF THE CONTAINER AND PALLET SHIPMENT AUTHORITY OF THE RSFSR MINISTRY OF INLAND WATER TRANSPORT, A. KRAYUKHIN, DEPUTY DIRECTOR OF THE ADMINISTRATION FOR INTERINDUSTRY COORDINATION AND PLANNING OF SHIPMENT OF PRODUCTS IN CONTAINERS AND PALLETS OF THE USSR GOSSNAB, V. MIKHAILOV, DIRECTOR OF THE INTERNATIONAL SHIPMENT DEPARTMENT OF THE CHIEF AUTHORITY FOR CONTAINER SHIPMENT AND COMMERCE OF THE MPS, A. ILYASOV, AS WELL AS WORKERS AT THE INDUSTRIES OF THE USSR MINISTRY OF THE MARINE AND THE RSFSR MINISTRY OF INLAND WATER TRANSPORTATION [MRF] AND WORKERS OF THE SCIENTIFIC RESEARCH INSTITUTES.

CONTAINER AND PALLET SHIPMENTS IN WATER TRANSPORTATION ARE DEVELOPING QUITE INTENSIVELY. THE ENTERPRISES OF BOTH MINISTRIES IN RECENT YEARS HAVE CREATED A RATHER GOOD MATERIAL TECHNICAL BASE, ENABLING AN ACTIVATION OF FREIGHT SHIPMENT IN CONTAINERS AND PALLETS BOTH IN OVERSEAS AND COASTAL NAVIGATION.

At 9 out of 28 marine ports using heavy-tonnage containers, container-loading complexes have been built. The marine fleet has specialized container ships, lumber pallet boats, ships of the "roll on/roll off" type and lighters. The container park has been supplemented with heavy-tonnage international-standard containers, manufactured at Soviet factories. A number of ports have created container servicing and repair sectors, others are constructing container repair bases. Thus, Leningrad has already introduced the first phase of one such base.

To improve the organization of freight shipment in containers, regular lines have been created and put into operation and a system has been organized to track the movement of Soviet heavy-tonnage containers abroad. The volume of such shipments to the regions of the Arctic, Far North and Far East has increased. Shipments between the USSR and the SEV [Council for Mutual Economic Assistance] nations are continuing to develop. Such shipments have especially increased between the USSR and Cuba.

The Ministry of the Marine intends to bring the volume of freight shipments in universal specialized containers up to 11-12 million tons in the 12th Five Year Period, including 9-10 million tons in heavy-tonnage containers, which is 15-16 percent more than in 1985. However, as emphasized at the conference, besides the Ministry of the Marine, it is necessary for the other ministries and agencies to outfit the industrial enterprises, as well as the ports of the Far North and Far East, with loading equipment and to increase the pace of containerization of overseas exports.

The development and formulation of an integrated technology for organization of the transport process "from door to door" is extremely necessary.

The conference devoted much attention to packaging. From 1981 to 1985, shipments of packaged freight in marine transportation increased from 12.7 to 14.6 million tons, or nearly 15 percent. However, the pace is still slow. It is slow because a number of ministries and agencies are not ready to dispatch their products in package. Thus, the Ministry of the Chemical Industry has been slow in introducing facilities for production of soft throwaway containers for mineral fertilizer. The enterprises of the USSR Ministry of Construction Materials have alleged cement shipment in substandard packages. The enterprises of the USSR Ministry of the Wood and Paper Industry and the MPS [Ministry of Ways and Communications] are also neglecting the packaging directives. During the past five year period, the volume of shipment of logs in stacks remained practically at the previous level. The MPS, pleading technical unreadiness of the freight customers, often refuses to accept loads in packaged form. Thus, in 1984, 22,600 out of 33,400 pallets arriving at the port of Kherson were broken up.

The main task of the MRF, mentioned at the conference, is currently the completion of full conversion to shipment of products in universal and specialized containers, in packaged form, and on pallets to the Yakutsk ASSR, the northern regions of the Irkutsk oblast, as well as the regions of the eastern sector of the Arctic, and in 1987 the remaining territories of the Far North. Thus, the volume of container shipments in direct mixed railroad/water traffic within the Lena Consolidated River Ferry Service should increase 3-4 fold and amount to no less than 700,000 tons in 1986. During the remaining period, it is necessary not only to determine the realistic volumes of delivery of packaged products, but also develop a coordinated program of action with the provisioning and sales organizations.

The USSR Council of Ministers has notified the State Committee of Standards to tighten control of product quality delivered to the regions of the Far North. However, according to information of the Osetrovo port, one fifth of

the packages arrive at the unloading point from the railroad in totally disassembled form. The agreement for exchange of containers between the MPS and the MRF has practically ceased to operate.

Great confusion occurs in the exchange of containers, it was reported at the conference. This is especially obvious in the Arctic. Containers arrive at Dudinka for the Norilsk mining and metallurgical combine by sea and by river. And according to the rules of exchange, the combine should separately settle its accounts with the river and the naval shippers. However, each year a large number of containers stay over winter in the Norilsk industrial region. The time has come, consider the members of the scientific-technical society, to negotiate a single agreement for exchange of containers and mutual settlement of obligations among the MPS, the Ministry of the Marine and the MRF. This will greatly increase their efficiency.

The conference noted that some work is also being done at the railroad to expand container shipments and speed up the container transport system. The task assigned to the Ministry of Ways and Communications is being carried out. Thus, in four years of the 11th Five Year Period, with a plan for 173.9 million tons in universal containers, 177.2 million were shipped. In the present year, after 10 months the volume of container shipments increased by 6.6 percent over the similar period of last year. From 1981 to 1984, there were 72 heavy-tonnage container handling centers, instead of 68, and 355 container yards were redesigned. Work is being done to employ computer technology in the shipment process. Problems are being solved relating to automation of the processes of planning, operational supervision, bookkeeping and accounting, and the work procedures of the container centers.

However, the achieved rate of growth does not meet the needs of the economy, due to failure to fulfill the plan of delivery of heavy and medium-tonnage containers, packaging materials, specialized platforms and other technical aids. The volume of shipments specified by the executive agencies is short by 335,000 containers, and many of those available are in poor condition.

Each year, more than one third the park of containers in use is dispatched to the regions of the Far North. However, the condition of the returning containers is extremely unsatisfactory. Often the enterprises employ them in improper ways. As many as 100,000 containers are delayed in returning by railroad each year. The delay may be as much as 8 months.

The conference developed a number of recommendations to improve the transport process, which will be sent to the USSR Gosplan and Gossnab, as well as the ministries and agencies involved in shipment of freight in containers and packages.

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PORTS AND TRANSSHIPMENT CENTERS

OFFICIAL ON NEED FOR REGIONAL TRANSPORT COORDINATION

Moscow VODNYI TRANSPORT in Russian 23 Jan 86 p 2

[Article by Yu. Lukin, director of the Northeastern Marine Authority: "Pre-Congress Tribunal: We Discuss the Project for a New Version of the CPSU Program, the Project for the CPSU Charter and the Project for the Basic Guidelines of Economic and Social Development of the USSR for the Years 1986-1990 and the Period up to the Year 2000: Where Agencies Overlap"; capitalized passages printed in boldface]

[Text] ONE OF THE WAYS OF IMPROVING THE COORDINATION OF ALL TYPES OF TRANSPORT WORK, ELIMINATING NONRATIONAL SHIPMENTS AND SHORTENING THE DELIVERY TIME OF FREIGHT IS, IN MY OPINION, THE CREATION OF REGIONAL TRANSPORT JUNCTIONS.

Such junction has been created and successfully operated in 1985 in the Central Arctic. The seamen, as well as all our partners in the transport process, have been convinced of the high efficiency of coordinated action where different agencies meet each other.

We have come to the conclusion that it is time to review the entire complex of overlapping responsibilities and create a modern, unified transport system in the Central Arctic. A regional junction has been created at Tiksi, including: the KHEGS [no expansion given], the SVUMF [Northeast Maritime Fleet Administration], the Northern Yakutsk Regional Administration of the LORP [no expansion given], the Nizhneyansk and Belogorsk river ports, the Tiksi seaport, the log raft roadstead of the Yakutles association, as well as the territorial administration for hydrometeorology and environmental protection and the Tiksi sea base.

Our main goal is to provide delivery of freight to the Arctic regions of Yakutiya with steady lowering of expenses. For this reason, an agreement was worked out and approved by all partners to organize the handling of transport facilities at all points of the regional junction in the volumes set by the USSR Gosplan. Emphasis was placed on strengthening the cooperation and eliminating bureaucratic obstacles. At the same time, a coordination council headed by the director of the SVUMF and a unified planning commission were created, taking on the socialist responsibilities of all the participants of the regional transport junction and determining joint measures of moral and material incentive. The work was planned out by year, quarter and month. The results were summarized in council and the foreseeable future was determined.

Each day, the coordination council would sit at the navigation center. After hearing the weather forecast, we would determine the items of importance to all participants of the transport process for an efficient planning of the work, without being distracted from the developed policy. What is the purpose of this? We did not exhaustively examine the state of affairs at each boat, dock, floating crane, but instead determined the main points governing the effective accomplishment of the overall goal.

For example, suppose that five ships require unloading at the bar of the Yana. There is a shortage of river boats, and the unloading may be delayed. The coordination council recommends the rivermen to concentrate on three specific vessels, handling them rather quickly. As a result, the Tiksi port receives a smooth load of tonnage so that, in difficult circumstances, it is able to intensify the unloading of logs or bring up ships to take on cargo transfers in other directions. Or another example. We are dispatching a fleet to Indigirka, which is the most difficult sector of the junction between maritime and riverine tonnage, due to the extremely shallow water and the characteristics of the sand bars, where the Belogorsk port can only operate in good weather.

First we notify the Belogorskiy port that good weather is anticipated. The coordination council proposes a more congested boat traffic, to exploit the favorable weather. A special chart is drawn up, and all of us know, including each captain of the vessels, at what time what boat will be unloaded and which particular barges will be involved in handling the fleet.

The sessions of the coordination council consume no more than 30 minutes. The adopted resolution determines a clearcut work program for the next day. We encourage our partners to abandon narrow bureaucratic interests and to think and solve problems for the common good. We try to define the major goal, where all attention, effort and capability is concentrated, so that the individual elements of the chain are not weakened, but strengthened during operations.

All this has raised the working efficiency of the regional junction. In 1984 we were able to deliver 80,000 tons of coal to the Yana, while in 1985 with the new system we have already delivered 120,000 tons. In 1984 we were able to ship coal to Indigirka only during a very extensive freeze, in late autumn. But in 1985 this was possible during the first half of August. Usually, tens of thousands of tons of freight remain at the Tiksi port for storage. With the present navigation, the customers have received all the cargoes, and not a single kilogram remained in port. Even the moldy wood, remaining in the log roadstead year in year out, was shipped off. Moreover, the ocean and river sailors handled the navigational jobs perfectly, surpassing the quota of the five year plan.

The decisions of the coordination council were binding on all partners. True, conflicts did occur, for which noninterested specialists were consulted, and the party and Soviet agencies extended us assistance. Representatives of the latter always took part in the work of the coordination council.

The effectiveness of the combination of efforts within a regional transport junction is high. But shipping lines serviced by the fleet of the SVUMF, the LORP and other ferry services at Kolyma are not part of the region. No matter what we do at Tiksi, at Yana and Indigirka in the way of mutual planning, no serious progress will be achieved unless the ports of Zelenyy Mys and Zyryanka on the Kolyma are included in the junction. Nearly all the partners depend on coordinated activity with these. Even now, preparing for the new navigational season, we intend to negotiate the question of including Zyryanka and Zelenyy Mys in the regional junction. We are also considering inclusion of the Yuryung-Khay port center on the Anabar. In a word, the regional junctions must be expanded. Therefore, we feel that SECTION VIII OF THE PROJECT OF THE BASIC GUIDELINES, AFTER THE WORDS "PROVIDE A COORDINATED DEVELOPMENT OF THE UNIFIED TRANSPORT SYSTEM OF THE NATION", SHOULD INCLUDE: "HAVING PAID SPECIAL ATTENTION TO THE DEVELOPMENT AND IMPROVEMENT OF THE REGIONAL TRANSPORT JUNCTIONS."

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PORTS AND TRANSSHIPMENT CENTERS

PROBLEMS IN IMPROVING COMBINED RIVER-RAIL SHIPPING

Moscow VODNYI TRANSPORT in Russian 30 Jan 86 p 2

[Article by V. Persianov, doctor of economic sciences and professor, and S. Miloslavskaya, candidate of economic sciences: "Recurrences of 'Hydrophobia': Current Problems with Combined Shipping"; capitalized passages published in boldface]

[Text] As we know, combined shipping is scheduled and carried out only in the event of producing a savings on transport expenses and other benefits as compared to direct railroad shipment. Moreover, the flow of coal, ore, cement, lumber and other freight is dispatched to the river transport system in the summer, when the railroad transport is operating under maximum load and experiencing difficulties with its carrying capacity. It is during this most busy time of operation of the nation's transport system that the vessels of the Ministry of Inland Water Transportation (MRF) perform nearly a quarter of the overall rail-water shipments of Russia.

At the same time, recurrences of "hydrophobia" have become increasingly frequent in recent years. The planned projects for transshipment of freight at many river ports of the Volga Consolidated Ferry Service and the Kamsk, Eastern Siberian and other ferry services are not being fulfilled. The volumes of shipment in combined rail-water traffic are decreasing. Several of the railway workers resolutely insist on curtailment of transshipment during the planning of shipments. In a casual, offhand manner, they seem to believe that no shortage of carrying capacity exists on the railroads of the European portion of the Union. In reality, such problem exists and is very acute.

In the fuel and energy budget projects it frequently happens that even a relatively minor increase in the estimated flow of coal by railway is difficult to bring about. Furthermore, it is necessary to eliminate other freight from the plan or to route the coal over very circuitous lines. In these circumstances, as the saying goes, beggars can't be choosers: it is better to deliver the freight with a certain (often sizable) extra mileage, than to leave it undelivered. Even apart from this, there is much freight presented for shipment but left undelivered. And even direct railroad traffic must often resort to detours. As a result, railroad economists estimate no less than 80 million rubles per year are wasted. This is a forced and, lamentably, inevitable measure for the time being.

The transport workers cannot and do not have the right to leave the factories without raw material or the cities without fuel, reserves of which are created for the winter not only within the jurisdiction of the TETs (to which they are confined), but also at the major river ports, e.g., the Moscow Southern Port. In the present case, the delivery of coal from this port to the TETs by railway as compared to truck (other alternatives are excluded) is profitable. The savings on freight costs amount to nearly a million rubles. Add to this the impact from the lower noise and air pollution in our capital, and there is nothing irrational about such system of provisioning the city with coal.

Certain aspects of the delivery of freight with two consecutive transshipments from one form of transport to another are, perhaps, dubious. The annual volume of such shipment is relatively low, but it does exist and, consequently, there is a problem. The question, however, is how to organize such shipments, the profitability of which has been proved by technical-economic analysis. In direct combined rail-water traffic with two transshipments, for example, apatite is sent from the Kola peninsula to Mangyshlak and Sumgait. This shipment, according to the Central Scientific Research Institute of Economics and Operation of Water Transport (TsNIIEVT), provides a savings of transport costs on the order of 5 rubles per ton of freight and reduces the full and empty mileage of the railroad cars by nearly 2500 kilometers. And after all, this is a tangible savings on the scarce park of railroad cars, and the savings is not small. Combined shipment (even with two transshipments) is also economically feasible for many other cargoes. According to calculations of the VNIIZhT [All-Union Railroad Research Institute], this is the case with shipment of coal to Leningrad, Pikalevo and Vyborg, Siberian timber to the Donbass, Kola ore to the Urals. The profitability of shipment of apatite from the Kola peninsula with transshipments at Cherepovets and Perm has been proved.

It is clear that questions of transshipment cannot be solved rashly, without careful and penetrating economic analysis. And while the shipment of ore of the KMA [no expansion given] with a double transshipment was economically justified at the start of the organization of such shipment, certain of its goods traffic have presently become nonrational. Accordingly, the Interdepartmental Commission for Rationalization of Shipment at the USSR Gosplan adopted a resolution for gradual reduction and total stoppage of such shipments by the end of the past five year period.

Are there unanswered questions about the current development of combined rail-water shipment? Yes, such questions do exist. The lack of planning and organization of combined shipments, instances of poor utilization of the overloaded capacities of a number of ports and disproportion in the development of the transshipment junctions cannot fail to cause alarm.

Many general-purpose ports require expanded facilities, especially in the river basins of Siberia and the Far East. Shutdowns of the port of Osetrovo, for example, occur for many reasons, not least of which is the lack of development of the railroad system of this port, which has frontage for the simultaneous unloading of more than 500 cars. However, the cars cannot be

supplied to all this frontage, due to inadequate capacities of the Lena and Portovaya stations. Projects to develop these stations have long been worked out, with assignment of the priority tasks, but the end of the construction is nowhere in sight.

The unloading of cargo from the ocean and river ports, in our opinion, may be greatly improved by using for this purpose, in addition to the main railroad transport, the industrial railroad transport enterprises (PPZhT) created at all the major transport junctions. Many of the PPZhT have substantial capacity and their own railroad car park, and they can take on a sizable share of the transshipped freight movement within the junctions.

It is necessary to improve the planning system for direct combined rail-water shipments and to supervise their execution. The volume of freight dispatched in direct combined rail-water traffic (but not transshipment at the ports) per five year period and per annum is approved by the USSR Gosplan, according to the recently established procedure. However, the railroads have their own procedure of so-called loading in kind, which begins with such cargo as ore, coal, lumber, etc. Transshipment (of the very same ore, coal, lumber, etc.) is specially labeled in this nomenclature, but is far from the first priority. The work evaluation primarily considers fulfillment of the shipment plan for freight displaying a list of loading in kind. Transshipment (especially a second transshipment) becomes a kind of interference, an annoying necessity, and it is no accident that the ports are kept on a "starvation diet."

Unfortunately, the outfitting of our port railway stations and parks, which does not meet the modern requirements, also contributes to the low priority of transshipment in the work of the railroads. There is not enough station track, and the available track often cannot handle the heavy mainline trains. The latest equipment of automation, signaling and communications are little used. Therefore, the dispatching of cars to the docks and warehouses actually takes a lot of time, which not only makes the transshipment more costly, but also holds back the growth of the goods traffic and results in lengthy stand-stills of the expensive maritime and river vessels. And there are also enormous secondary expenses which cut out a significant portion of the income, e.g., in the shipment of export/import goods.

Elimination of the disproportions in the production capacities of the maritime and river transport, on the one hand, and the railroad, on the other, is one of the major conditions for improving the efficiency of direct combined rail-water shipment, making the handling work at the ports cheaper and faster.

The bureaucratic tendencies to isolation and to the curtailment of contacts and cooperation among the types of transport create the danger of inflicting serious economic hardship. Direct combined rail-water shipment can and should become fast, convenient and economical. Whether or not it will become such depends on all those involved in the combined traffic, including the freight dispatchers and receivers, and not least the railroad workers and their goodwill toward cooperation with the sailors, the river boat men and the truck drivers on a foundation of close cooperation and collaboration.

THE SCIENTIFIC RESEARCH AND DEVELOPMENT ORGANIZATIONS OF THE MINISTRY OF WAYS OF COMMUNICATION, THE MINISTRY OF THE MARITIME FLEET, THE MINISTRY OF TRANSPORTATION CONSTRUCTION AND THE MINISTRY OF THE INLAND WATER FLEET MUST DEVELOP A GENERAL PLAN OF ALLOCATION OF TRANSSHIPMENT CENTERS IN THE TRANSPORTATION NETWORK AND SCIENTIFICALLY SUPPORT THEIR DEVELOPMENT, HAVING IN VIEW INCREASED TECHNICAL OUTFITTING OF ALL POINTS OF JUNCTION BETWEEN THE WATERWAYS AND THE RAILROADS TO A LEVEL ENABLING EFFICIENT UTILIZATION OF THE DOCK FRONTAGE, MACHINERY AND WAREHOUSES, AND AN INCREASED TRANSSHIPMENT CAPACITY OF THE NATION'S TRANSPORTATION SYSTEM.

It is necessary to strengthen the requirement for rational utilization of production capacities of the various kinds of transportation, for which WE PROPOSE THAT THE SECOND PARAGRAPH OF SECTION VIII OF THE PROJECT OF THE BASIC GUIDELINES HAVE THE FOLLOWING WORDING: "TO PROVIDE A COORDINATED DEVELOPMENT AND UTILIZATION OF EXISTING PRODUCTION CAPACITIES OF THE VARIOUS KINDS OF TRANSPORTATION AND THEIR COOPERATION WITH OTHER SECTORS OF THE ECONOMY, TO IMPROVE THE COORDINATION AMONG THE TYPES OF TRANSPORT IN DIRECT AND COMBINED TRAFFIC..." and so forth.

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INTERSECTOR NETWORK DEVELOPMENT

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OPTIMIZING PETROLEUM PRODUCT SHIPMENT

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[Article by A. N. Grigoryev, chief of the USSR Goskomnefteprodukt [State Committee for the Supply of Petroleum Products] administration for transporting petroleum products; I. D. Gordeyev, chief management specialist of USSR Goskomnefteprodukt; V. S. Levina, department head for planning shipments of industrial freight of the MPS [Ministry of Railways] main freight administration; Candidate of Economic Sciences V. G. Karchik; and Candidate of Economic Sciences B. P. Nemtsov (Moscow-Leningrad): "Optimizing Petroleum Product Shipments"]

[Text] The growth in public production and a further increase in the national economy's demand for fuel resources are causing a necessity to develop the petroleum refining industry. At the present time, petroleum product shipments on the country's transportation system exceed 1.2 trillion ton-kilometers. Development of the petroleum refining industry and an increase in the demand for petroleum products are causing a necessity to conduct a study on economizing transportation costs in shipping them.

Development of the petroleum drilling and petroleum refining industry, the configuration of the transportation network that has taken shape, and the features of demand for petroleum products determined the nonuniformity of siting petroleum refining enterprises according to the country's regions with a high level of production concentration.

There are power surpluses in Belorussia and in the northwest, Volgo-Vyatsk, and central regions. The Baltic, southwestern Ukraine and Moldavia, Siberia, and the Far East are included among regions with a steady shortage of motor vehicle gasoline and diesel fuel. The siting of enterprises like this in accordance with petroleum product refining determines the configuration of their freight flows in the country's transportation system.

Positive changes for the better in siting petroleum refining during the 10th Five-Year Plan made it possible to improve the supply of regions with petroleum products. The putting into operation of the Mozyr and Mazheykyay petroleum refining plants improved the geography of shipping petroleum products to the western part of the country. Shipments of diesel fuel and motor vehicle gasoline from the Volga regions to the southwestern part and to the Baltic were reduced, and shipments from the Volga and Ural areas to the Donbass and Dnepr

areas were sharply reduced with termination of construction of the Lisichansk petroleum refining plant. At the present time, the putting into operation of the Pavlodar plant provided eastern Kazakhstan's consumers, who formerly received petroleum products from Omsk and Ufa, with petroleum products. However, the nonfulfillment of enterprise construction plans in Chimkent, Chardzhou, and Achinsk led to an intensification of petroleum refining at plants in the Volga and Urals areas and, as a result, to an increase in shipping costs; that created difficulties in delivering petroleum products from plants in Ufa, Kuybyshev, and Gorkiy.

Calculations of optimum plans for shipping petroleum products, which were made at the Leningrad Institute of Railway Engineers (LIIZhT) and the main computer center of USSR Gosstab, indicated that trends that determine the current configuration of petroleum product freight flows will completely retain their validity for the long term too. An analysis of ties between regions also showed that the main task in reducing petroleum product shipments is the optimization of transporting the resource surplus from the Volga and Ural areas to regions of the Baltic, Ukraine and Moldavia, Kazakhstan, Central Asia, and the Far East. Coordinating the operation of rail, pipeline, and river transportation assumes great importance here. At the same time, in our opinion, it's advisable to begin construction of petroleum refining plants in the southwestern part of the country and in the Far East with the objective of an improvement in providing the national economy with petroleum products.

Table 1. Load Structure of a Unified Transportation Network With Petroleum Product Shipments for 1981

(1) Виды транспорта	(2) Отправле- ние, %	(3) Грузооборот, %	(4) Средняя дальность перевозок, км
Железнодорожный (5)	79.2	79.6	973
Нефтепродуктопроводный (6)	11.3	8.3	706
Речной (7)	6.8	8.7	1236
Морской (каботаж) (8)	2.7	3.4	1200
Все указанные виды (9)	100.0	100.0	967

Key:

- | | |
|--|----------------------------------|
| 1. Types of transportation | 5. Rail |
| 2. Shipping, percentage | 6. Petroleum product pipeline |
| 3. Freight turnover, percentage | 7. River |
| 4. Average shipping distance, kilometers | 8. Maritime (coastal navigation) |
| | 9. All indicated types |

The load structure of a unified transportation network with petroleum product shipments for 1981 is cited in table 1. As can be seen, a leading role belongs to rail transportation in terms of freight turnover and shipping. In terms of

shipping, a large role falls as well to pipeline transport, which ships more than the river and maritime (in coastal navigation) fleet.

During recent years the network of petroleum product pipelines, where in 1982 the dispatch level exceeded the 1975 shipping volume by 63 percent, is being developed in a most dynamic manner. At the same time, the low increase in shipments of petroleum freight on river (16.1 percent) and maritime (2.3 percent) transportation, with an average increase of 22 percent for all types of transportation during the 7 year period, is attracting attention.

Table 2. Changes in the Average Shipping Distance of Individual Petroleum Products in Percentage by Years

(1) Наименование груза	Годы (2)							
	1975	1976	1977	1978	1979	1980	1981	1982
Нефтепродукты (3)	100	98.5	97.2	95.5	92.1	90.2	87.5	87.3
Дизельное топливо (4)	100	98.1	97.2	97.5	90.8	90.3	85.4	84.6
Бензин (5)	100	99.1	98.4	98.9	85.4	92.7	89.3	89.1
Керосин (6)	100	97.6	96.7	96.5	98.9	100.1	98.9	100.6
Мазут (7)	100	98.4	96.1	91.3	88.3	85.4	81.4	83.6

Key:

- | | |
|------------------------|-------------|
| 1. Freight description | 5. Gasoline |
| 2. Years | 6. Kerosene |
| 3. Petroleum products | 7. Mazut |
| 4. Diesel fuel | |

Changing the geography of siting petroleum refining enterprises by construction of the Mozyr, Pavlodar, Mazheykyay, and Lisichansk plants as well as developing a pipeline network led to a decrease in the average shipping distance of petroleum freight on rail transportation, especially of diesel fuel and mazut. Changes in the average shipping distance of individual petroleum products (in percentage by years) are presented in table 2. A sharp lead in shipping in comparison with freight turnover is typical of different grades of industrial mazut. This led to a decrease in the average distance of shipping it from 1,046 kilometers (1975) to 874 kilometers (1982), or 172 kilometers. A decrease like this in distance occurred as a result of changing the siting of petroleum refining in the Baltic and in the southwestern and eastern part of the country.

The average distance of shipping motor vehicle gasoline decreased to a lesser extent (107 kilometers) and it's almost on an identical level with mazut and diesel fuel (167 kilometers). The decrease in average distance is occurring for a number of reasons, specifically because of nonfulfillment of the bulk plan in the Volga, Kazakhstan, and Ural regions that supply the southeastern part of the country with petroleum products. Nonfulfillment of the planned shipping volume

for this freight by rail transportation has an effect as well. In 1982 Goskomnefteprodukt and MPS shipped 47,000 tons of motor vehicle and tractor fuel from Novopolotsk to the republics of Central Asia, in this case having performed work of 150 million ton-kilometers more in comparison with shipping in accordance with the plan. As a result, in 1982 average shipping distance was reduced by only 2 kilometers.

In 1982, according to data of USSR Goskomnefteprodukt, 13.2 million tons of petroleum products were delivered by the maritime fleet in coastal navigation and 3 times as much (35.2 million tons) by the river fleet. Basic freight operation at sea is performed by the Caspian Shipping Line, to the lot of which 67 percent of all petroleum product shipping falls. The Volga-Kama basin, where the portion of petroleum product shipments is 78 percent, plays a dominant role in river transportation.

Research of the water traffic patterns of the "Volgotanker" Shipping Line shows a high level of shipping concentration. Kuybyshev, Ufa and Kambarka, to the lot of which over 60 percent all shipping falls, are the leading ports for shipping gasoline, diesel fuel, and high-sulphur industrial mazut. Over 90 percent of all petroleum products (gasoline, diesel fuel, and high-sulphur industrial mazut) being shipped from the Kuybyshev wharves is dispatched to the south, and 90 percent of the petroleum freight as well from Ufa, Kambarka, and Perm is being delivered to the Gorkiy, upper Volga, and northwestern regions. For the most part, high-sulphur mazut flows are planned in cross haul traffic patterns. In our opinion, for relieving rail transportation it's necessary to sharply increase the reception of petroleum products and to provide for further development of mixed rail service at the ports of Yaroslavl, Gorkiy, Volgograd, and Kalinin. Implementation of these measures will make it possible to improve the operational situation on a number of rail network sections that are operating under strained conditions.

USSR Goskomnefteprodukt provides for appropriate development of river petroleum tank farms. The use of "river--sea" type ships provides a large savings in transportation resources. For example, in 1982 over 1 million tons of petroleum products from points located on the Volga were shipped on these vessels, and that made it possible to release rolling stock for shipping petroleum freight to other regions of the country. This amount could be increased by using the transshipping petroleum tank farms of Klaypeda and Ventpils. The possibilities of using the river fleet in the Volga-Kama basin are limited by the tardy execution of plans for constructing petroleum berths and mazut pipelines in Ufa, Perm, Gorkiy, and Pavlodar and at river electrical power stations in Volgorechensk, Volgograd, Volzhsk, Volgodonsk, and Novocheboksarsk. According to estimates this would make it possible to increase water shipping by more than 4 million tons per year.

An interdepartmental commission attached to USSR Gosplan, USSR Goskomnefteprodukt, and USSR Minneftekhimprom [Ministry of the Petroleum Refining and Petrochemical Industry] are occupied with questions of making freight shipments more efficient on a unified transportation network, and the transportation ministries (MPS, MMF [Ministry of the Maritime Fleet], and MRF RSFSR [RSFSR Ministry of the River Fleet]) are taking an active part in the development of practical measures

for making petroleum product shipments more efficient and for implementing them. As is known, these measures are authorized by decrees of USSR Gosplan and USSR Gossnab.

During the 1980-1982 period, a fruitful study was made jointly with USSR Minneftekhimprom and the transportation ministries on reducing the distance of shipping petroleum products by rail transportation and cutting transportation costs. Basically, the specified measures--which are aimed at reducing long distance hauls and eliminating cross hauls and other inefficient hauls by improving the siting of production, and of USSR Minneftekhimprom plants in particular; introducing additional capacities; constructing new petroleum product pipelines and distributing units; and switching rail shipments to through water and mixed rail-water service--were implemented in making petroleum product shipments more efficient. During these years the average shipping distance of petroleum products was reduced by 32 kilometers and savings in transportation costs were 34.4 million rubles.

In 1983 measures for making petroleum product shipments more effective are providing a further reduction in the shipping distance of petroleum products via rail transportation basically by increasing their pumping along the Grozny--Armavir--Rostov, Ufa--westerly direction, Lisichansk--Nizhnedneprovsk petroleum product pipelines; putting installations into operation for primary oil refining and catalytic reforming at the Achinsk, Lisichansk, and Pavlodar petroleum refining plants; and increasing petroleum product shipments in through rail-water and through water service. As a whole from implementing these measures it's planned to reduce the transportation operation by more than 5 billion ton-kilometers and costs by 10 million rubles.

Scientifically sound planning of shipments by all kinds of transportation is of great importance in questions of making petroleum product shipments more efficient. The complexity of national economic ties for petroleum supply, an increase in the scales of processing petroleum products, and the dynamics of change in consumption of their assortment urgently demand an improvement in planning petroleum product deliveries. First and foremost these operations must be directed towards an end result. It's necessary to examine the problem of making shipments more efficient in a combination of ways--to manage not only the process of planning petroleum product deliveries, but also to actively influence petroleum refining and to strive for a product assortment siting that would provide the most effective modes of production and transportation. Measures for saving fuel resources, the observation of consumption norms, and consumption of separate grades of petroleum products give rise to the necessity for influencing the volume and variety of products that are being allocated in a territorial cross section.

Decisions of the 26th CPSU Congress and subsequent decrees of the CPSU Central Committee and the Council of Ministers, which are directed towards improving the planning process and strengthening the economic mechanism's effect on an improvement in production efficiency and work quality, are aimed at obtaining the maximum effect by coordinating long-range, current, and operational planning. Therefore, for purposes of strengthening the coordination of the planning process for petroleum product shipments by separate kinds of transportation it's

necessary to use economic and mathematical methods and state-of-the-art computer technology means.

In this direction the LIIZhT jointly with the MPS main freight administration and the USSR Goskomnefteprodukt transportation administration on an optimum basis developed diagrams of normal freight flow routes of petroleum products (SNNGNP), which are being used right now as a standard document that restricts inefficient shipments of them on rail transportation. Information for the year and by quarters on production and consumption in an administrative cross section of the country was obtained on the basis of data of petroleum sales organizations concerning A-72, A-76, and A-93 grades of motor vehicle gasoline, diesel fuel (summer and winter), industrial mazut, motor vehicle and diesel oil, asphalt, and the remaining petroleum products (a total of 25 grades). Information, which included data for navigational and internavigational periods, was prepared on this basis for calculations on an EVM [computer]. An economic and mathematical model of a multistage transportation linear programming task--which was developed at the USSR Gosnab Scientific Research Institute of Material and Technical Supply [NIIMS] and takes into consideration the resources of petroleum refining plants, the demands of rayons (oblasts), the refining capability of petroleum tank farms with transshipment from water and pipeline to rail transportation, as well as the traffic capacities of sections of the pipeline network--served as software for solving the task.

Table 3. Shipping Data in Percentages for Motor Vehicle Gasoline and Diesel Fuel for a Year on the Average

(1) Вид транспорта	Автобензин (2)		Дизельное топливо (3)	
	(4) Отправление	(5) Грузооборот	(4) Отправление	(5) Грузооборот
Железнодорожный (6)	71.4	75.4	69.7	72.1
Трубопроводный (7)	21.6	16.9	25.8	22.4
Водный (8)	7.0	7.7	4.5	5.5
(9) Всего	100.0	100.0	100.0	100.0

Key:

- | | |
|----------------------------|-------------|
| 1. Types of transportation | 6. Rail |
| 2. Motor vehicle gasoline | 7. Pipeline |
| 3. Diesel fuel | 8. Water |
| 4. Shipment | 9. Total |
| 5. Freight turnover | |

The calculations were performed in three stages. During the last stage on the basis of analysing consumer potentials, estimates that were used for letting products through according to transshipment sections of the pipeline network were found for each petroleum product in accordance with each section of an all-product petroleum pipeline. Assorted transportation tasks were calculated in

terms of bulk volumes according to stations. Accordingly, national economic ties were established between suppliers and consumers in accordance with product assortment and the load structure of various types of transportation. Data are cited in table 3 in percentages for motor vehicle gasoline and diesel fuel for a year on the average.

An analysis of transportation plans made it possible to give specific recommendations on correcting petroleum product supply and proposals on strengthening the carrying and processing capacity of individual sections of petroleum product pipelines and petroleum tank farms. During 4 years 102 plans were calculated on a computer in a cross section of current planning (for a year and according to quarters). The calculations were performed at computer centers of USSR Gossnab, the October Railroad, and LIIZhT. On the basis of optimum plans calculated on a computer SNNGNP were developed for navigational and internavigational periods according to grades of motor vehicle gasoline, diesel fuel, mazut, and kerosene for burning, which then were examined and necessarily revised at the MPS main freight administration and USSR Goskomnefteprodukt. At the present time, these diagrams are being used during the compilation of plans for shipping petroleum products.

For a further reduction in freight turnover of petroleum products in rail transportation it's very important to make appropriate corrections in current SNNGNP in a timely manner, as well as to develop new ones. For example, according to calculations that were made at the USSR Goskomnefteprodukt administration for transporting petroleum products, there is a possibility (within allocated funds) of organizing the interchangeability of motor vehicle gasoline deliveries of the most widely used A-72 and A-76 grades in a regional cross section. An increase in shipping volumes of winter and heavy diesel fuel and the general demand for it are causing the development of appropriate SNNG in a seasonal cross section.

Experience in using the indicated methods of compiling SNNGNP showed that they provide for rapidly receiving the results of calculations during individual stages. For purposes of reducing the labor-intensiveness of solving tasks, obtaining more reliable plans, and using this method in operational planning a different approach, which is based on solving a general linear programming problem with the use of applications program packages (MPS and MPSX), was developed at LIIZhT for calculating a multiproduct transportation task (MTZ). By means of them it's possible to calculate optimum shipping plans on a YeS [single series] 1040 type computer and higher with comparatively low expenditures of working time. Conditions were generated on the basis of the MTZ model for shipping 5 types of petroleum products: A-72, A-76, and A-93 grades of motor vehicle gasoline, and summer and winter diesel fuel. The shortest rail distance was taken as the optimization criterion. For comparability of shipping costs by various types of transportation the shortest distance for delivering freight by water transportation is corrected by a special coefficient that represents the ratio of tariffs for shipment by water and rail transportation to a given distance. When petroleum products are transported by pipeline, distance is determined in a similar manner. At the present time, several versions of calculations that are distinguished by a different content of model limitations have been performed, and over-all dimensionality of the task is $1,035 \times 65,324$. One calculation is on the average no more than 2 hours of computer time on the YeS 1040 computer.

Reference calculations were performed on a YeS 1040 computer on the basis of NIIMS techniques and with the use of a new model for conditions of the inter-navigational period (1st and 4th quarters) to determine the effectiveness of the new approach towards solving an MTZ for shipping petroleum products on a unified transportation network. According to these calculations, rail transport plays a dominant role in providing petroleum product supply (nearly 80 percent) in a unified transportation network. A comparison of the calculations that were performed shows that shipping volume changed negligibly. The shipping volume was more than 131,000 tons and the average distance was less than 33 kilometers for a plan that was obtained in accordance with the LIIZhT model. It's necessary to note that a reduction in the average distance is observed according to all types of transportation: the least is in rail transportation (15 kilometers) and the most is in maritime transportation (130 kilometers). In this regard, freight turnover was reduced by 2.6 percent in rail transportation and by almost 10 percent in pipeline transport. A significant increase in shipping volume (60 percent) in maritime transportation led to a total increase of 20 percent in freight turnover, and the greatest reduction in average distance was obtained by virtue of this. It's important to note that the reduction in average shipping distance that was obtained in rail transportation is achieved mainly by the effect of optimizing shipments of A-76 grade motor vehicle gasoline where savings were almost 70 kilometers by virtue of better utilization of all-product petroleum pipelines, the load of which increased by almost 700,000 tons.

The results of solving a task and compiling plans are an indication of the advantages of performing optimum calculations on the basis of the new model, and by which it's possible to conduct operations for improving the development of SNNGNP. It's necessary to note that the current level of software and hardware of state-of-the-art computers makes it possible to implement new functions. In this regard, it's necessary to transfer the compiling of SNNG to a computer, and that will make it possible to reflect optimum plans in them in the most precise manner and to develop these diagrams for shorter periods of their operation (a year, 6 months, a quarter). In this connection it's necessary to develop such software that would make it possible to organize a printout of SNNGNP in two execution versions for the user: in the form of schematic flow maps and in a typewritten form that is similar to documents that are in effect at the present time.

For automating the development of SNNGNP at LIIZhT an appropriate network schematic map and information on the rail network with regard to the administrative division of union republics and section-by-section bulk were prepared, and an algorithm and a program were developed for solving a transportation task with an automatic arrangement of conditions of section-by-section consumption with regard to oblast division, as well as an algorithm and a program for generating schematic maps and flows on it by means of a computer plotter.

It's known that at the present time five-year and annual planning of petroleum product shipments is accomplished by USSR Gosplan with the participation of transportation ministries. However, for purposes of more complete utilization of resources and satisfaction of the needs of the national economy for petroleum products it's necessary in the near term to make a transition to planning

petroleum product shipments, beginning with five-year planning with a breakdown by years and annual planning with a breakdown by quarters. Solution of these tasks will make it possible to conduct the development of a plan in a more valid manner for developing the industry with regard to construction and modernization of all-product petroleum pipeline systems and the petroleum tank farm economy. Since the current practice of manually compiling plans leads to frequent coordination, annual planning in siting petroleum product production requires improvement and scientific justification.

Operational plans for attaching petroleum product consumers to bulk stations determine the extent of transportation costs and are the most important link in work on making national economic ties more efficient. Therefore, the solution of this task consists of improving the quality of compiling operational plans by optimum attachment of petroleum product consumers to bulk stations and expedient specialization of petroleum product shipments in accordance with a unified transportation network.

But the optimization of solutions in the area of planning petroleum product shipments is inseparable from improving monthly planning at enterprises of USSR Minneftekhimprom. Here it's important to solve problems of product assortment planning and nonuniformity of plans in the production of petroleum products. According to optimum plans that were calculated, rail transport performs nearly 10 percent of the unnecessary ton-kilometer work because of the nonuniform specialization of the motor vehicle gasoline product assortment from the total shipping volume. An improvement in siting the product assortment makes it possible to reduce the work of railroads by 3.2 billion ton-kilometers. Calculations showed that for eliminating cross hauls of identical grades of ethylated and nonethylated motor vehicle gasoline it's advisable to organize the production of A-72 grade nonethylated motor vehicle gasoline at enterprises of the Urals and Siberia in a quantity that satisfies the needs of the timber industry. An improvement in siting the production of nonethylated gasoline can reduce the freight turnover of railroads by 440 million ton-kilometers.

At the present time, the Kirishskiy plant is sending over 600,000 tons of nonethylated motor vehicle gasoline annually to Moscow by rail to meet the flows of petroleum products from Yaroslavl and Gorkiy. In 1983 it was projected to reduce the freight turnover of railroads by 125 million ton-kilometers by increasing the output of motor vehicle gasoline at the Ryazan petroleum refining plant.

Since a disproportion in siting the product assortment causes an increase in shipping distance, the problem of siting diesel fuel with a flash point of 61 degrees centigrade requires a solution. If the average shipping distance of summer diesel fuel according to optimum plans for the internavigational period is 718 kilometers, then it's 1,690 kilometers for diesel fuel with a flash point of 61 degrees centigrade.

The disparity of product assortment programs for the output of different grades of mazut relative to consumption in a territorial cross section also leads to a large volume of cross hauls. For example, a surplus of high-sulphur mazut, which is being hauled basically to the western Urals, the Volga area, Kazakhstan

and Central Asia at a distance from 2,000-5,000 kilometers, is being generated at enterprises in Siberia. Delivery volumes from Angarsk to Kazakhstan and from Omsk to Central Asia are especially significant. At the same time, over 600,000 tons of low-sulphur mazut from Kuybyshev and Baku are being sent in the opposite direction to Siberia and Kazakhstan's metallurgy centers. The total volume of cross hauls of this freight just within Kazakhstan, Central Asia, and Siberia is over 7 billion ton-kilometers. Mass cross hauls of sulphurous and low-sulphur industrial mazuts by rail and water transportation are occurring also in the European part of the country in a north to south direction.

The transportation factor still isn't adequately taken into consideration at the time of planning resources for refining petroleum products, and the operational plans that are compiled are distinguished by extreme instability. Research conducted at LIIZhT showed that the instability of production plans, unsuccessful transportation variants, and inefficient concentration of resources according to product assortment are the main reasons for an increase in average shipping distance. According to MPS reports that were accomplished in accordance with monthly plans, it follows that the average shipping distance of petroleum products on railroads is 30-50 percent higher than calculated optimum plans basically by virtue of the nonuniformity of production plans. This hinders planning in terms of product assortment and volume, and it leads to significant deviations from approved standard freight flows and to errors in attaching consignees to suppliers.

The nature of changes in monthly fuel production plans and shipping plans for an appropriate period shows that close links exist between them. Therefore, an opportunity presents itself to provide a quantitative assessment of increasing freight turnover by virtue of the instability of production plans for motor vehicle gasoline and diesel fuel. It can be obtained by calculating the aggregate of operational optimum plans and compiling special functions (of freight turnover) according to each grade in terms of the sum total of periods (months)

$\Sigma pl_{мес}$ and for a year as a whole $\Sigma pl_{год}$:

$$\Delta \Sigma pl = \sum_{i=1}^{12} \Sigma pl_{мес} - \Sigma pl_{год}$$

This difference constitutes losses in runs of rail transportation's rolling stock by virtue of an increase (decrease) in the resources of individual suppliers in comparison with the average (annual) level of the fuel production plan. Over 50 percent of the optimum plans were calculated with a method like this at the October Railroad's computer center. The execution of calculations made it possible also to determine the quality of compiling operational plans for attaching consumers to suppliers at the transportation administrations of organs for supplying the RSFSR and UkSSR with petroleum products.

For assessing the effect of the product assortment factor on shipping distance calculations were made for the sum total of consumption level resources of A-72, A-76 grade motor vehicle gasoline, inasmuch as it's known that interchangeability like this is partially allowed at the time of planning deliveries. Optimum plans were calculated according to quarters, navigational and internavigational periods, and for a year. A total of 12 operational optimum plans were calculated for A-72 grade motor vehicle gasoline.

An analysis of results showed that optimization makes it possible to reduce freight turnover by 70 kilometers (8.5 percent) on the average in terms of diesel fuel and motor vehicle gasoline; moreover, half of this quantity falls to errors in attachment plans and the remaining portion is excess freight turnover that is caused by changes in production plans (19 kilometers) and by nonuniformity of the product assortment (16 kilometers). Excess freight turnover just in terms of A-72 and A-76 grades of motor vehicle gasoline by virtue of nonuniform resource planning is 624 million ton-kilometers for a year, and it's 505 million ton-kilometers on account of nonuniform siting of the product assortment. This indicates that inefficient shipments occur not only because of improperly established national economic ties between consumers and suppliers in the area of material and technical supply, but also on account of nonuniform planning of transportation resources.

The quality of an operational plan is determined by the workers' occupational skills and their knowledge of transportation geography, the consumption market conditions of individual fuel grades in different republics, and current SNNGNP. Therefore, when generating an optimum attachment plan on a computer, it's necessary to observe the following procedure: first of all, process the primary information on resources and consumption, and then calculate the attachment and balancing task in two stages. For cutting expenditures of computer time during the first stage it's necessary to reduce the task's dimensionality to the maximum extent possible and to consolidate information on resources and consumption. When generating a set of consumers and suppliers, exclude bulk stations that are of local importance and then correct the appropriate provision of attachment regions with petroleum products. Consumption according to administrations and republics is totaled in permissible reports of optimum plans with regard to the features of siting petroleum refining plants and developing the transportation network. Then the multiproduct transportation task according to the LIIZhT model, which takes into consideration the necessity of balancing resources and consumption, is calculated on this basis. As a result, a definitive set of all resources is established once and for all by virtue of bulk specialization at stations of the pipeline network, and with regard to alternative attachment versions flows are selected that conform most to current SNNG and that provide a minimum of deviations. Then data are collected on resources and consumption, and supplier and consumer sets that completely conform to the ones that exist in operational planning are generated once and for all.

During the second stage, product assortment transportation tasks are solved where the selection of conditional consumers is limited by the current set of consumers for operational planning (petroleum product consumption in accordance with USSR Goskomnefteprodukt administrations is determined with regard to all exceptions that are caused by nonalignment of the transportation network with the boundaries of railroads). Then product assortment transportation tasks with complete sets of suppliers and consumers are solved. A comparison of variants of alternative solutions, among which are the ones that most completely satisfy current SNNGNP, is made following the calculation of each task.

Achievement of the final result--the assimilation of an optimum plan into practice is possible with the use of state-of-the-art data processing software. The development of operating computer systems and remote data processing means and

the appearance of direct access memory units that are counted on for storage and rapid processing of a large volume of information make it possible to create reliable data processing software in the form of organizing their dynamic model of an information process in a computer memory (information on planning the country's petroleum product supply). The implementation of a dynamic model of an information process is possible on the basis of a data bank by means of which one can simultaneously, cardinally, and qualitatively solve a problem for optimizing petroleum product shipments at all planning levels.

These tasks can be solved by developing and creating an automated system for continuous planning of petroleum product shipments, which must accomplish purposeful management of the process for receiving and distributing petroleum products on the basis of economic and mathematical methods of planning and management, as well as appropriate means for information acquisition and processing. The continuous provision of the national economy with petroleum products for satisfying state needs at the least costs is its ultimate end.

Development of this system will require certain time. However, right now it's advisable to work out available methods for planning petroleum product shipments with the use of computers that are based on economic and mathematical modeling. Developing the optimization of shipments and deliveries with regard to petroleum product demands that are specifically taking shape will make it possible to create the most efficient continuous system for providing the national economy's needs with petroleum products at the least transportation costs.

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